Beyond the Sacred Hour
Supporting Exclusive Breastfeeding in the Early Postpartum Period

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I have no conflicts of interests and no disclosures to make

All Babies are Born to Breastfeed!

Where are we now?

2010 US Breastfeeding Rates
- Any Breastfeeding
  - Initiation 76.9%
  - 6 months 47.2%
  - 12 months 25.5%

- Exclusive Breastfeeding
  - 3 months 37.7%
  - 6 months 16.4%

2020 Healthy People Goals
- Any Breastfeeding
  - 81.9%
  - 60.6%
  - 34.1%

- Exclusive Breastfeeding
  - 46.2%
  - 25.5%

Outline

A. Benefits of exclusive breastfeeding during the first six months after birth
   - Immune protection
   - Optimal growth and development
   - Cost and convenience

B. Common challenges & evidence-based practices that support exclusive breastfeeding in the postpartum period
   - Hypoglycemia
   - Hyperbilirubinemia
   - Early weight loss
   - Maternal concerns

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A. Benefits of exclusive breastfeeding during the first six months after birth
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   - Maternal concerns
Immune Protection

“Human milk is a complex fluid that simultaneously provides nutrients and bioactive components to facilitate the adaptive, functional changes required for the optimal transition from intrauterine to extrauterine life.”


<table>
<thead>
<tr>
<th>Artificial Milk</th>
<th>Inert Fluid</th>
<th>Human Milk</th>
<th>Living Tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centrifuged &amp; magnified X 100</td>
<td></td>
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</tr>
</tbody>
</table>

Host Defenses in Human Milk

- **Cellular elements**
  - Lymphocytes, PMN & Macrophages
- **Immunoglobulins & other direct anti-infective agents**
  - IgA, Secretory IgA
  - Lactoferrin
  - Lysozyme
  - Callin
  - Mucin
- **Anti-inflammatory agents**
  - Vitamin A, C, E
  - Catalase
  - Glutathione peroxidase
  - PAF acetylhydrolase
  - Prostaglandins
- **Immunomodulators**
  - Prolactin
  - Cytokines
  - Cortisol, thyroxine, insulin & growth factors
  - Interleukins
  - Interferon
  - TNF & TGF
- **Other bioactive factors**
  - Oligosaccharides
  - FFA
  - Nucleotides
  - Glutamine, Taurine
  - EGF

Enteromammary Immune System

- **Prebiotics** – support beneficial bacteria in gut
- **Act as decoys for pathogens**

Enteromammmary Immune System

Health Begins in the Gut

- **Gut** - largest immune organ in the body
  - Functionally immature at birth - significant intestinal permeability
  - Tight junctions of GI mucosa take several weeks to mature and close
  - Closure of tight junctions occurs faster in breastfed infants than in formula-fed babies. (Galvez, 1995)
  - Protects against absorption of pathogens and whole proteins
  - sIgA from breastmilk coats the gut, providing passive immunity during a time of reduced neonatal gut immune functions. (Hanson, 2004)

<table>
<thead>
<tr>
<th>Intestine</th>
<th>Colon</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Artificial fed</th>
<th>Breastfed</th>
</tr>
</thead>
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<td>Intestine</td>
<td>Colon</td>
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Human Milk Creates a Protective Environment in the Gut

- **Promotes normal gut microflora**
  - *Lactobacillus bifidus* (probiotics)
    - Predominate
  - *Gram-negative enteric organisms*
    - Almost completely absent
- **Creates and maintains a low intestinal pH**
  - pH 5.1 - 5.4 - Human milk fed
  - pH 5.7 - 6.0 - Supplemented with formula
  - pH 5.9 - 7.3 - Formula fed

Bullen, Tearle, & Stewart, 1977.
Risks of Supplementation

- **Supplementation of formula** changes the bacterial profile of breastfed infants to resemble that of formula-fed infants
  - pH is higher – less protective
  - Less bifidobacteria – no longer dominant
  - More gram negative & anaerobic bacteria

  Mackie, Sghir, & Gaskins, 1999

- Takes 2-4 weeks of breastfeeding to return to normal flora
- Tight junctions widen – allowing pathogens to be introduced
  - One supplementation with formula leads to colonization with bacteria that induces an inflammatory response.


### Hypothetical scheme demonstrating the effect of commensal microorganisms on the intestinal production of proinflammatory mediators such as IL-8 and the subsequent propagation of inflammatory mediators to proximal (intestinal) as well as distal organs (lung and brain).


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  B. Common challenges & evidence-based practices to support exclusive breastfeeding in the postpartum period
    - Hypoglycemia
    - Hypertension
    - Early weight loss
    - Maternal concerns
    - Crying newborn
    - Growth spurts
    - Breastfeeding in public

### Human Milk Provides Protection from Sepsis in NICU

<table>
<thead>
<tr>
<th>Sepsis Rate</th>
<th>Breastmilk</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 0-10</td>
<td>5% (2/38)</td>
<td>10% (1/10)</td>
</tr>
<tr>
<td>Day 11-24</td>
<td>9% (4/43)</td>
<td>20% (8/42)</td>
</tr>
<tr>
<td>Day 25-38</td>
<td>0% (0/19)</td>
<td>15% (11/72)</td>
</tr>
</tbody>
</table>


### Milk is Species Specific
Milk Protein is Very Different

- **Human Milk**
  - Casein:whey - 40:60
  - Beta-casein
  - Small volume micelles
  - Soft, flocculent curd

- **Bovine Milk**
  - Casein:whey - 80:20
  - Alpha-casein
  - Double the volume
  - Hard curd

Carbohydrates in Human Milk

- **Lactose**
  - Principle carbohydrate of human milk
  - Comes with digestive enzyme - lactase
  - Newborns are **never** lactose intolerant
    - Except in very rare genetic disorders

- **Oligosaccharides**
  - Multiple functions

Fats in Human Milk

- Provides 50% of calories
- **Cholesterol**
  - High level in human milk
  - Essential for myelin formation in the brain development
- **Long chain fatty acids**
  - Important for brain and visual development
  - Arachidonic acid (ARA) - Omega 6 fatty acid
  - Docosahexanoic acid (DHA) - Omega 3 fatty acid

Breastmilk and Subsequent Intellectual Performance in Premature Infants at 8 yr

- **Human Milk** = Higher IQ

- **Significant factors affecting IQ**
  - Social Class
  - Mother’s Education
  - Female Gender
  - Mechanical Ventilation

- **Receipt of Human Milk** + 8.3 IQ points

IQ at 8 Years Old Correlates with Duration of Breastfeeding in Premature Infants

Superior Fat Absorption

- Lipase – fat-digesting enzyme
- 98% of fats are in the form of triglycerides
  - Saturated and unsaturated fatty acids
  - Attached to glycerol backbone in specific positions
    - sn1, sn2, sn3
- 75% of saturated fatty acids are Palmitic acid
  - Human milk: sn-2 position
  - Bovine milk: sn1 and sn3 positions


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   - Growth spurts
   - Breastfeeding in public

Cost to Families

- Baby Center:
  - An average baby drinks 9,125 ounces of milk during their first year
- First Year Baby Cost Calculator
  Formula: $105/month x 12 = $1260

Mead Johnson

- Enfamil Premium Infant
  - Powder pouches – makes 250 fluid oz
    - $35.23 each = $1286 (1 year)
- Enfamil Premium Infant
  - Powder can – makes 167 fluid oz
    - $23.98 each = $1311 (1 year)

“Provides nutrition similar to breastfeeding”
**Abbott**

- Similac Advanced
  - Powder can – makes 168 fluid oz
  - $24.16 each = $1312 per year

- Similac Advanced
  - Read to feed - 1 quart
  - $6.53 each = $1889 per year

“Complete Nutrition for Your Baby’s 1st Year Closer Than Ever to Breast Milk”

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**Cost to Society**

- If 90% of US families could comply with medical recommendations to breastfeed exclusively for 6 months, the United States would
  - Save $13 billion per year
  - Prevent > 911 deaths per year
    - Nearly all of which would be in infants

- If 80% compliance, the United States would
  - Save $10.5 billion per year
  - Prevent 741 deaths per year


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**Convenience of Breastfeeding**

(for mothers who are not pump dependent)

- No mixing
- No heating
- No refrigeration
- No bottles to clean, store, transport
- Never run out of milk
  - At home or away
  - Travel
  - Camping
  - Natural disasters

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**Babies at Risk for Hypoglycemia**

- Large for Gestational Age (LGA)
- Small for Gestational Age (SGA)
- Low birth weight (<2500 g)
- Preterm (<37 wk)
- Late Preterm Infants (34 0/7-36 6/7 wk)
- Inborn Error of Metabolism (IEM)
- Beckwith Wiedemann Syndrome
- Microphallus or midline defect (possible pituitary defect)
- Maternal drug treatment (terbutaline, propranolol, oral hypoglycemics)
- Maternal diabetes mellitus
- Perinatal stress (severe acidosis, hypoxia-ischemia)
- Cold stress
- Respiratory distress
- Suspected infection
Hypoglycemia

- Definition is controversial
  - No significant correlation among plasma glucose levels, clinical symptoms and long-term sequelae
  - Difference in type of sample studied
    - Plasma glucose levels 10-15% > whole blood glucose
  - Bedside glucose testing strips good for screening
    - Vary significantly from true glucose levels

Physiologic Nadir

- Normal drop in glucose over first 2 hours
  - Self limiting
  - Spontaneous rise in 2-3 h whether fed or not
- Compensated by ketogenic response to protect brain
  - Even with prolonged intervals between feeds (> 8 h)
  - No evidence that asymptomatic hypoglycemic infants benefit from treatment
    - Normal neurologic outcomes

Evidence-based Practices

American Academy of Pediatrics
Academy of Breastfeeding Medicine

AAP 2011 Guidelines

- Breastfed term infants have
  - Lower concentrations of plasma glucose
  - Higher concentrations of ketone bodies than do formula-fed infants
- It is postulated that breastfed infants tolerate lower plasma glucose concentrations without any clinical manifestations or sequelae of neonatal hypoglycemia because of the increased ketone concentrations.

AAP 2011 Guidelines

- No single concentration or range of plasma glucose concentrations that is associated with clinical signs.
- No consensus regarding when screening should be performed and which concentration of glucose requires therapeutic intervention in the asymptomatic infant.

AAP 2011 Guidelines

- The generally adopted glucose concentration that defines neonatal hypoglycemia for all infants (<47 mg/dL) is without rigorous scientific justification.
  - Symptomatic infants with glucose < 40 mg/dL
    - Treat with IV glucose
  - At-risk asymptomatic infants
    - Management differs for the period from birth to 4 hours vs. 4 to 24 hours.
Treatment of At-Risk Asymptomatic Infants

- From birth to 4 hours after birth:
  - Initial feeding should begin within 1 hour and glucose testing 30 minutes AFTER the first feeding.
  - If the initial glucose level is < 25 mg/dL, then refeed and recheck glucose level in 1 hour.
  - If the second glucose level remains lower than 25 mg/dL, treat with IV glucose.

- If the second glucose level is 25 to 40 mg/dL:
  - Re-feed or treat with IV glucose as needed.

- From 4 to 24 hours after birth:
  - Continue feedings every 2 to 3 hours and check glucose level before each feeding.
  - If the glucose level is less than 35 mg/dL, refeed and recheck glucose level in 1 hour.
  - If glucose level remains lower than 35 mg/dL, treat with IV glucose.
  - Target glucose level > 45 mg/dL
  - Goal glucose level = 40-60 mg/dL.

Guidelines for Glucose Monitoring and Treatment of Hypoglycemia in Breastfed Neonates

Revision June, 2006

ABM Clinical Protocol #1

- Recommended low thresholds: plasma glucose level
  - 1-2 h after birth: 28 mg/dL (1.6 mmol/L)
  - 3-47 h after birth: 40 mg/dL (2.2 mmol/L)
  - 48-72 h after birth: 48 mg/dL (2.7 mmol/L)

- Normal glucose nadir may be even lower in healthy term breastfed infants

- Early and exclusive breastfeeding meets the nutritional and metabolic needs of healthy, term newborn infants

General Recommendations

- Routine supplementation is unnecessary and may interfere with establishing normal breastfeeding and normal metabolic compensatory mechanisms
- Initiate breastfeeding within 30-60 min after birth and continue on demand (crying is very late sign)
- Feedings should be frequent
  - Minimum of 10-12 per day during first few days after birth
- Facilitate skin-to-skin contact of mother and infant
Glucose Screening

- Routine monitoring of blood glucose in asymptomatic, term newborns is unnecessary and may be harmful
- Glucose screening should be performed only on at risk or symptomatic infants
- Bedside screen must be confirmed by formal lab testing
- Continue monitoring until normal preprandial levels

Management of Asymptomatic Hypoglycemic Infants

- Continue breastfeeding every 1-2 hours or
- Feed 3-5 mL/kg if not breastfeeding
  - Expressed colostrum, donor breastmilk, elemental formula, partially hydrolyzed formula, term formula (in order of preference)
- Recheck blood glucose before next feeding until value is normal and stable
- Avoid forced feeds (no gavage)
  - Use IV if infant unable to suck or tolerate feeds
- This infant not normal and needs further evaluation
- If glucose remains low, begin IV glucose therapy

Management of Symptomatic Hypoglycemic Infants

- Symptomatic or glucose < 20-25 mg/dL (<1.1-1.4 mmol/L)
  - Initiate IV 10% glucose
  - Do not rely on oral or intragastric feeding
- Maintain glucose levels > 45 mg/dL (> 25 mmol/L)
- Adjust IV rate by blood glucose concentration
- Encourage frequent breastfeeding
- Monitor glucose levels before feeds as IV is weaned
- Document response to treatment

Supporting Mothers

- Concerns or risk for hypoglycemia causes stress to mother and family
  - Assure mother there is nothing wrong with her milk
  - Assure her that any needed supplement is usually temporary
- Have mother hand-express or pump milk for infant
  - Can overcome feelings of inadequacy
  - Helps establish full milk supply
- Facilitate skin-to-skin contact during IV therapy
  - May lessen trauma of intervention
  - Provides physiologic thermoregulation
  - Stimulates milk production

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  - Common challenges & evidence-based practices to support exclusive breastfeeding in the postpartum period

Hyperbilirubinemia

- Early weight loss
- Maternal concerns
- Crying newborn
- Growth spurs
- Breastfeeding in public

Risk Factors

- Infant Risk Factors
  - Prematurity, late preterm
  - Bruising, cephalohematoma
  - Hemolysis
  - Blood type incompatibilities
  - DAT positive
  - Polycythemia
  - G6PD deficiency
  - Family history
  - East Asian or Mediterranean
  - Infection
  - Delayed stooling of meconium
  - Poor feeding

- Maternal Risk Factors
  - Diabetes
  - Obesity
  - Pre-eclampsia
  - Cesarean delivery
  - Infant separation
Common Confusion

Physiologic Jaundice vs. Starvation Jaundice (often inaccurately called “Breastfeeding” Jaundice) vs. Breastmilk Jaundice

Physiologic Jaundice

- Normal unconjugated hyperbilirubinemia of all newborns during the first week after birth
- Functional role of bilirubin as potent antioxidant
- About 40% of newborns have bilirubin level of
  - 5 mg/dL at 24 h of age
  - 7 mg/dL at 36 h of age


Starvation Jaundice

- Unconjugated hyperbilirubinemia resulting from reduced caloric intake below the optimal intake for age
- Not unique to infants - occurs in adults as well
- May occur even without absolute starvation
- Relative starvation leads to
  - Increase in intestinal absorption of bilirubin
  - Decreased passage of meconium to eliminate bilirubin
  - Bilirubin levels may exceed normal limitations of metabolism and transport during newborn period


Breastmilk Jaundice

- Unconjugated hyperbilirubinemia that extends into the second and third weeks after birth and often up to 8-12 weeks
- Occurs in about 2/3 of breastfed infants
- Vigorous, feeding well, gaining weight
- Enhanced intestinal absorption of bilirubin
- May be genetic predisposition
- Intervention is usually not necessary
  - Unless levels exceed 20 mg/dL
  - Phototherapy or formula x 12 h will bring levels down


Evidence-based Practices

Academy of Breastfeeding Medicine
American Academy of Pediatrics

ABM Clinical Protocol # 22

Guidelines for Management of Jaundice in the Breastfeeding Infant Equal to or Greater Than 35 Weeks’ Gestation

General Recommendations

- Early initiation of breastfeeding
  - Preferably in the first hour after birth
  - (vaginal AND cesarean deliveries)
- Exclusive breastfeeding encouraged
- Feeding anything prior to the onset of breastfeeding
  - Delays establishment of good breastfeeding by infant
  - Delays establishment of adequate milk production
  - Increases risk of starvation & weight loss
  - Increases risk of exaggerated hyperbilirubinemia

Breastfeeding Medicine. 2010;5(2):87-93

General Recommendations

- Optimize breastfeeding management from the beginning
  - Assure position and latch
- Provide education on early feeding cues
  - Teach mother to put infant to breast before crying

Breastfeeding Medicine. 2010;5(2):87-93

The more frequent the breastfeeding, the lower the likelihood of hyperbilirubinemia

In Japan, a study was conducted to assess the effect of breastfeeding on hyperbilirubinemia. The study found that breastfeeding infants were less likely to develop hyperbilirubinemia than formula-fed infants. The lower the number of breastfeeding sessions, the lower the risk of hyperbilirubinemia.

Breastfeeding Medicine. 2010;5(2):87-93

Phototherapy

- Provide phototherapy in mother’s room if possible
- Continue exclusive breastfeeding
  - Interruptions of phototherapy for up to 30 minutes does not reduce effectiveness of treatment
- Home phototherapy if possible
  - Discouraged for infants with risk factors
- Breastfeeding infants readmitted from home
  - Should be admitted to a unit where mother can reside and breastfeeding can continue without interruption

Breastfeeding Medicine. 2010;5(2):87-93
Bili-Bed
No eye mask needed

Supplementation?
- Usually not necessary if mother is available and willing to breastfeed frequently
- Continue breastfeeding if giving supplementation

Supplementation with Artificial Milk
- Use of hydrolyzed protein formula preferred
  - May be more effective in reducing bilirubin levels
  - Less likely to induce milk allergies or intolerance
  - May not be viewed by parents as “switching to formula”
- Avoid excessive amounts of formula
  - To maintain frequent breastfeeding
  - Preserve maternal milk production at high level
  - Small gastric volume in first few days
- Adequate caloric intake and volume should be assured
- Avoid use of nipples/teats and bottles if possible
  - Cup or supplemental nursing device suggested

Supplementation?
- Expressed breastmilk, donor breastmilk, formula
- Only when:
  - Clear indication of inadequate intake
  - Weight loss > 10% after attempts to correct breastfeeding problems
  - Failure in milk production or transfer
  - Pre/post weighing after attempts to correct breastfeeding problems
  - Evidence of dehydration
  - Significantly abnormal electrolytes, poor skin turgor, sunken fontanelle, dry mouth, etc.

Neonatal Feeding Amounts for the First Five Days Following Birth (Full Term Infants)

<table>
<thead>
<tr>
<th>DAY</th>
<th>PER FEEDING</th>
<th>TOTAL in 24 HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Few drops to 5 mL (1 tsp)</td>
<td>Few drops to 1 oz (2 Tbsp)</td>
</tr>
<tr>
<td>2</td>
<td>5-15 mL (&lt;0.5 oz or &lt;1 Tbsp)</td>
<td>1-4 oz (0.25-0.5 cup)</td>
</tr>
<tr>
<td>3</td>
<td>15-30 mL (0.5-1 oz or 1-2 Tbsp)</td>
<td>4-8 oz (0.5-1 cup)</td>
</tr>
<tr>
<td>4</td>
<td>30-45 mL (1-1.5 oz or 2-3 Tbsp)</td>
<td>6-12 oz (1.5 cup)</td>
</tr>
<tr>
<td>5</td>
<td>45-60 mL (1.5-2 oz or 3-4 Tbsp)</td>
<td>12-18 oz (1.5-2 cups)</td>
</tr>
</tbody>
</table>

Normal Newborn Stomach Capacity

- The capacity of the newborn stomach after birth is very small in the first 2 days.
- In a 3-kg baby, the average physiological capacity of the stomach is:
  - 6 ml on the first day (6 mL x 8 feeds = 56 mL)
  - 12 ml on the second day (12 mL x 10 feeds = 120 mL)
- The average volume of mother's colostrum is:
  - 25-56 mL total on the first day
  - 113-185 mL total on the second day


Colostrum Ingested on Day One

Abstract

- Objective: To determine the mass of colostrum ingested by exclusively breastfed newborn infants during the first 24 hours of extrauterine life.
- STUDY DESIGN: Milk ingested during the first 24 hours of life by 90 healthy newborn infants was evaluated by use of a scale with high sensitivity. The masses were measured during 8-hour periods. Associations of the mass measured with prenatal and postnatal factors were tested.
- RESULTS: The mass of colostrum ingested was evaluated in 307 feedings, with 3.4 +/- 1 feeds recorded per 8-hour period of observation. Mean gain per feeding was 1.5 +/- 1.1 g. The daily mass of milk ingested by newborn infants was estimated at 15 +/- 11 g. This volume did not show a tendency to increase during the first 24 postnatal hours, nor was it related to perinatal or postnatal factors or to breastfeeding time.
- CONCLUSIONS: During the first 24 hours after birth, newborns ingested 15 +/- 11 g of milk.


Visual Aids for Newborn Stomach

- IV Fluids?
  - Infants under phototherapy
    - Do NOT routinely require IV fluids
  - IV fluids may be indicated in:
    - Dehydration with hypernatremia
    - Inability to ingest adequate milk
  - Routine IV fluids are discouraged
    - May inhibit thirst and diminish oral intake

AAP Guidelines

Key elements for clinicians

#1. Promote and support successful breastfeeding
In numerous policy statements, the AAP recommends breastfeeding for all healthy term and near-term newborns. This guideline strongly supports this general recommendation.

**RECOMMENDATION 1.0:**
Clinicians should advise mothers to nurse their infants at least 8 to 12 times per day for the first several days.

Poor caloric intake and/or dehydration associated with inadequate breastfeeding may contribute to the development of hyperbilirubinemia.

Increasing the frequency of nursing decreases the likelihood of subsequent significant hyperbilirubinemia in breastfed infants.

Providing appropriate support and advice to breastfeeding mothers increases the likelihood that breastfeeding will be successful.

**RECOMMENDATION 1.1:**
The AAP recommends against routine supplementation of nondehydrated breastfed infants with water or dextrose water.

Supplementation with water or dextrose water (PO or IV) will not prevent hyperbilirubinemia or decrease TSB levels.

Assure mother that hyperbilirubinemia is not her fault.
- Nothing wrong with her milk
- Breastfeeding is the optimal method of infant feeding

Explain temporary nature of any interventions.
- Jaundice not likely to recur after treatment

Assure adequate lactation support.
- Position, latch
- Pumping, hand expression

Assure adequate family support.
- Rest, food, fluids

7%-10% loss is considered normal for breastfed baby.

Most babies should be back at birth weight by 10-14 days after birth.

10% of birth weight loss is NOT equivalent to “10% dehydration”.
- Does warrant attention and evaluation
- Late preterm infant measures should be taken earlier

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   - Hypoglycemia
   - Hyperbilirubinemia

**Early weight loss**
Maternal concerns
**Expert Opinion**

- A loss of 7% is **average** in the first week for the breastfed infant. (Lawrence and Lawrence)
- If the baby loses 7% in the **first 72 hours** ->
  - Breastfeeding should be observed by a trained professional for proper technique and milk transfer.
- If the baby is nursing well, appears otherwise healthy, and has appropriate stooling patterns ->
  - Another weight check should be scheduled in two days.

**Excessive Maternal IV Fluids**

- The use of IV fluids in labor causes a large shift of fluid from the mother to the fetus especially when D5W or Lactated Ringer’s is used. (Keppler)
- In cases of women who have received large amounts of IV fluids in labor, it is important to be aware that the baby’s birth weight may be inflated by excessive fluid stores in the infant.
- The infant’s initial weight loss may be greater than 10% maximum due to surplus fluid loss.

**Excess Weight Loss in First-Born Breastfed Newborns Relates to Maternal Intrapartum Fluid Balance**

- Only 2 variables predicted excess weight loss
  - Intrapartum fluid balance
    - Compared to < 100 mL/h
      - 100-200 mL/h - aRR 2.8
      - > 200 mL/h - aRR 3.6
  - Delayed lactogenesis
    - aRR 3.5
- Conclusions
  - Intrapartum fluid administration can cause fetal volume expansion and greater fluid loss after birth.

**Methods**

- In this observational cohort study, data was collected about maternal oral and IV fluids during labour or before a caesarean section
- Participants (n = 109)
  - Weighed their newborns every 12 hours for the first three days - then daily to Day 14
  - Weighed neonatal output (voids and stools) for three days.

**Results**

- At 60 hours (nadir), mean newborn weight loss was 6.57% (SD 2.51; n = 96, range 1.83-13.06%).
- When groups, based on maternal IV fluids, were compared
  - ≤1200 mL (n = 21): newborns lost 5.51%
  - > 1200 mL (n = 53): newborns lost 6.93% (p = 0.03)
- First 24 hours, bivariate analyses showed positive relationships between Maternal IV fluids (final 2 hours) and neonatal output (r(42) = 0.383, p = 0.012)
- At 72 hours, there was a positive correlation between Grams of weight loss and all maternal fluids (r(75) = 0.309, p = 0.007)

**An Observational Study of Associations among Maternal Fluids during Parturition, Neonatal Output, and Breastfed Newborn Weight Loss**

- The relationship between the intravenous fluids women receive during parturition (the act of giving birth, including time in labour or prior to a caesarean section) and their newborn’s weight loss during the first 72 hours postpartum was the primary interest.


The electronic version of this article is the complete one and can be found online at: http://www.internationalbreastingjournal.com/content/6/1/9

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Conclusions

- Timing and amounts of maternal IV fluids appear correlated to neonatal output and newborn weight loss.
- Neonates appear to experience diuresis and correct their fluid status in the first 24 hours.
- We recommend a measurement at 24 hours, instead of birth weight, for baseline when assessing weight change.


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- Hyperbilirubinemia
- Early weight loss

Maternal concerns

Promoting Exclusive Breastfeeding

- Lactation support focus: three critical determinants
  1. Establishment of a robust milk supply
  2. Effective attachment (latch-on and transfer of milk)
  3. Maternal confidence
- These are the three most common issues, accounting for the largest drop off in breastfeeding, which occurs within the first several postpartum weeks.

(Ertem, 2001; Taveras, 2003; Kuall, 1999; Dewey, 2003)

Common Maternal Concerns

- I don’t (wont’) have enough milk.
- My baby doesn’t know how to breastfeed.
- My baby doesn’t want to breastfeed.
- I’m too tired to breastfeed.
- I’m going back to work so I want my baby to get used to the bottle.
- I want dad to feed the baby so they will bond.
- I’m afraid my baby will just use me for a pacifier.
- I don’t want to spoil my baby.
- My baby is crying so he must be hungry.

“I don’t (or won’t) have enough milk.”

- Suggested Conversation:
  Key: You have the perfect volume of milk for your baby’s stomach today.
  - Your baby’s stomach volume is very small.
  - It perfectly matches the amount of milk you have right now.
  - Baby needs small volumes to suck/swallow/breathe without choking.
  - And can also practice while your breasts are soft.
  - When your milk volume increases in a few days your baby will be really good at feeding and ready for larger volumes.
  - Avoid using the phrase “when your milk comes in.”
  - You can increase your milk volume faster by
    - Holding your baby skin to skin
    - Feeding your baby frequently (every 1-3 hours)
  - Collect the drops on a clean plastic teaspoon.
  - Feed to the baby.

Hand Expression of Breastmilk

- Gently massage both breasts by hand.
- Place thumb and index fingers about an inch above and below the areola.
- On the first breast, pull the hand inward, towards the chest, (not outward toward the nipple) while you compress finger pads together.
- Repeat this action in a rhythmical pattern, and each time, bring the finger pads slightly closer together (a tighter compression, as tolerated without pain)
- After 10 – 20 compressions, switch to the other breast, . . . then back to the first . . . then back to the second again, etc. Do this despite the presence or absence of colostrum.
- Collect the drops on a clean plastic teaspoon.
- Feed to the baby.
Hand Expression

Hand Expression

Colostrum

Mature Milk

newborns.stanford.edu/breastfeeding

“My baby doesn’t know how to breastfeed.”

Suggested Conversation:

- All newborns are born knowing how to breastfeed.
- Breastfeeding is one of their natural instincts.
- But they need to be skin to skin with mother for their natural instincts to be activated.
- Having clothes on and being wrapped in a blanket is confusing to many babies.
- Within a few days they will be very good at breastfeeding with clothes on, but in the first day or so they need to have as much skin next to mother as possible to be able to breastfeed easily.

Key

Too Little Skin to Skin

Plenty of Skin to Skin

newborns.stanford.edu/breastfeeding

“My baby doesn’t want to breastfeed.”

Suggested Conversation:

- Most babies sleep a lot in the first day.
- Your baby is recovering from the birth too.
- Your baby is just trying to figure out the world.
- The “baby steps” of learning will come more naturally if we keep your baby skin-to-skin with you and just practice breastfeeding.
- In the meantime, we also need to “phone in your order” for lots of milk, because they’ll need it after 3 days.
- You may need to pump or hand express your milk if baby is too sleepy.
- In the meantime, we also need to “phone in your order” for lots of milk, because they’ll need it after 3 days.
- You can feed it to baby in several different ways.
- This is a learning time for both of you.
- Put on your nightlight if your baby starts moving around or wakes up. I’ll come in and help you.
- You are doing a great job!

Key

“I’m too tired to breastfeed.”

Suggested Conversation:

- I know it’s hard to get used to feeding a baby as often as he needs to eat, but it will get easier.
- It may seem easier to bottle feed now but it’s really much easier to breastfeed once you get the hang of it.
- Is there anyone who can help you with other things so you can sleep whenever your baby sleeps?
- It’s a good idea to limit or eliminate all extra visitors for now so you can concentrate on feeding baby and sleeping.

Key

“I’m going back to work so I want my baby to get used to the bottle.”

Suggested Conversation:

- Feeding from the breast and from the bottle require completely different mouth and sucking movements.
- Your baby could be confused by trying to learn both at the same time.
- Or your baby may learn to prefer the bottle because it’s easier to just swallow milk than suck it out.
- Babies who learn to bottle feed first often don’t breastfeed well, but babies who learn to breastfeed first usually can go back and forth easily later on.

Key

It’s worth it to focus just on breastfeeding during the first few weeks after birth. You can introduce a bottle later.
"I want dad to feed the baby so they will bond."

- Suggested Conversation:
  - Dad and baby can bond during diaper changes.
  - Baths are good bonding times too.
  - Baby’s love being skin to skin with dads when they aren’t hungry.
  - It’s really important for dad’s and babies to form strong bonds.

"I’m afraid my baby will just use me for a pacifier."

- Food for Thought:
  - Why aren’t we concerned that babies will just use pacifiers as substitutes for mothers?
- Suggested Conversation:
  - Baby’s need almost constant closeness with their mothers and very frequent sucking.

"I don’t want to spoil my baby."

- Suggested Conversation:

"My baby is crying so he must be hungry."

- Suggested Conversation:

Outline

A. Benefits of exclusive breastfeeding during the first six months after birth
   - Immune protection
   - Optimal growth and development
   - Cost and convenience
B. Common challenges & evidence-based practices to support exclusive breastfeeding in the postpartum period
   - Hypoglycemia
   - Hyperbilirubinemia
   - Early weight loss
   - Maternal concerns
   - Crying infant

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"Don’t stand unmoving outside the door of a crying baby whose only desire is to touch you. Go to your baby. Go to your baby a million times."

— Peggy O’Mara
Understanding Infant Crying

- Infant crying is a basic instinctive communication
  - Designed to elicit an adult response.
  - Vital infant "super power" critical for survival
- Maternal concern is a basic instinctive response
  - Designed to meet needs of distressed infant

“Great Expectations”

- Milk will come in on the day of birth
- Baby will latch perfectly every time
- Baby will cry briefly, feed easily, then be quiet and go to sleep
- Baby will eat 3 or 4 times a day
- Parenting will be easy during the first 6 weeks

Triad for Breastfeeding Failure

1. Unrealistic expectations about newborns and breastfeeding
2. Lack of preparation for breastfeeding
3. Formula seen as solution to all problems

Misconceptions

- Myth: Formula is the solution to all problems
  - "I gave him a bottle and he stopped crying."
- Truth: No one can cry and swallow at the same time
  - If forced to swallow, crying will stop
  - Even if hunger was not the reason for crying
  - Set up for feeding to solve all adult problems

Reality

We need to warn parents on day 1 about day 2

- Day 1 – brief crying, breastfeeds during quiet alert state, sleeps for long periods
- Day 2 – baby awake and crying
  - Something is wrong! Do something!
  - You mean he needs to eat every two hours?
- Parents need to understand infant cues and sleep states
Understanding Infant Cues

Engagement cues
Disengagement cues
Hunger cues

Often simplistic, subtle, not specific
Often must be a detective to find out what baby wants

Resources to Teach Parents About Behavioral Cues

- Baby Cues – A Child's First Language
  - Keys to Caregiving – NCAST. [www.ncast.org](http://www.ncast.org)
- Understanding the Secret Language of a Newborn
  - Help, Understanding, Guidance for Young Families
- Secrets of Baby Behaviors
  - lactation.ucdavis.edu/products/babybehaviorproducts.html

Understanding Infant Sleep
(A Useful Tool)

- Babies do not sleep exactly like adults
  - Sleep cycles 60 minutes vs. 90-120 minutes
- Active sleep (REM) = brain development
  - 20-30 min in term infant
  - A good time to invite baby to feed
- Deep sleep (NREM) = growth
  - 20-30 min in term infant
  - Not a good time to invite baby to feed

Understanding “Growth Spurts”

- Warn mothers about periods of frequent feedings
  - Perceived insufficient milk supply
  - Major reason mothers stop breastfeeding
- Provide explanation
  1) Normal
    - Nature’s way to increase milk supply for growing baby
    - Count number of wet diapers for reassurance – at least 6 per 24 h
  2) Predictable
    - First episode often occurs in 2nd or 3rd week
    - Recurs every 4-6 weeks
  3) Temporary
    - Frequent feeding only lasts 2-3 days

Baby as a Teaching Tool

- Use baby as teaching tool
  - “See how your baby is in active sleep. If you hold him until he is in a deep quiet sleep, he won’t wake up when you put him down.”
  - “See how deeply your baby is sleeping. She does not even startle when there is a noise. This is not a good time to try to feed her. Just wait until she cycles back into active sleep. Then invite her to wake up and feed.”
  - “See how she is trying hard to tell you that she needs something to be different. Let’s see if we can figure out what it might be?”

If we miss the early feeding cues....
Breastfeeding in Public

Double Standard

Acceptable. Obscene?

Breastfeeding in Public

Even when practiced discreetly, naked eyestrains and disgusting glances still meet with those who dare to unfold feed in public.

Breastfeeding in Public

Tips You Need to Hide Your Nips

 even when practiced discreetly, naked eyestrains and disgusting glances still meet with those who dare to unfold feed in public.
Less of these

More of these
§ 43-53. Notwithstanding any other provision of law, a mother may breastfeed her child in any location in which the mother is authorized to be.

California Civil Code

_all babies are born to breastfeed!_

"A mother may breastfeed in any place she has a right to be!"

Thank you for empowering mothers to meet their breastfeeding goals.

Breastfeeding is Right!