Breastfeeding and Postpartum Implications for Infants and Women Affected by Diabetes During Pregnancy

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American Academy of Pediatrics

- Human milk is species-specific, and all substitute feeding preparations differ markedly from it, making human milk unique and optimal and superior for infant feeding
- Breastfeeding should be continued for at least the first year of life and beyond for as long as mutually desired by mother and child


The World Health Organization

Recommends, “infants should receive nutritionally adequate and safe complimentary foods while breastfeeding continuously up to 2 years of age or beyond”
Breastfeeding is Preferred

Breastfeed a minimum 3 + months (preferably to 1 year)
  Breastfed infants are leaner
Decreases the incidence of diabetes in the offspring
  Fewer infections in infants
  Breastfed infants have higher IQs

Women with diabetes can successfully breastfeed with proper education, planning and support

Breastfeeding in Beneficial for Mom

• Breastfeeding beneficially effects glucose/lipid metabolism in women
• Lactation assists with weight loss postpartum
• In the Nurses Health Study 1 year of breastfeeding decreased the diabetes rate by 15% in the normal population of women
• Breastfeeding helps reduce or delay risk of subsequent diabetes in women with a history of GDM history

Obstet Gynecol 1993; 82:451-5
**Good for the Mother**

- Improved Glucose Metabolism
  - Non-insulin mediated use of glucose by mammary gland to synthesize lactose
  - Increased insulin sensitivity due to increased prolactin and decreased estradiol
  - Improved beta cell function with 3 months of breastfeeding in women with GDM

**Breastfeeding Benefits the Infant**

- Early breastfeeding appears to reprogram the eating centers in the brain (Cripps 05)
- A review of the clinical literature concluded that early cow's milk exposure may be an important determinant of subsequent DM1 in the infant, and may increase the risk ~1.5X
  (Diabetes Care 1994;17(1):13-19)
- Other Studies have identified foods such as gluten or wheat as trigger for type DM1 (Trigger Studies)
- Pima Indian and Finish studies demonstrated just 3 months of breast feeding reduced the lifetime incidence of DM2 by ~13%

**Good for the Offspring**

- Breastfed Infants are Leaner
  - Inverse relationship between breastfeeding and development of obesity
- Formula fed infants produce more insulin
  - Hyperinsulinemia retards lipolysis and enhances fat deposit
Fetal Origins of Adult Disease

- The β-cells of the fetal pancreas become more responsive to glucose late in gestation and β-cell mass increase in the last trimester of pregnancy
- Theory: A high availability of glucose programs pancreatic islet development irreversibly influencing the metabolic response to glucose later in life and predisposing to certain patterns of adult disease.

Risks of Not Breastfeeding for Infants and Mothers

<table>
<thead>
<tr>
<th>Infant</th>
<th>Mother</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Diarrhea and gastroenteritis</td>
<td>▶ Retention of gestational weight gain</td>
</tr>
<tr>
<td>▶ Enterocolitis in preterm infants</td>
<td>▶ Postpartum depression</td>
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<tr>
<td>▶ SIDS</td>
<td>▶ Metabolic syndrome</td>
</tr>
<tr>
<td>▶ Asthma, pneumonia, ear infections and bacterial infections</td>
<td>▶ Type 2 DM</td>
</tr>
<tr>
<td>▶ Childhood obesity and type 2 DM</td>
<td>▶ Premenopausal breast cancer</td>
</tr>
<tr>
<td>▶ Childhood leukemia</td>
<td>▶ Ovarian cancer</td>
</tr>
</tbody>
</table>
In the Hospital

- Encourage breastfeeding within first hour of life
- And for every hour for first 4 hours
- Feed on demand when possible
- If nursing is delayed, pump to establish the milk supply and prevent engorgement

*http://www.cdph.ca.gov/programs/BreastFeeding/Pages/default.aspx

Type 1 Diabetes and Breastfeeding

- Breastfeeding is strongly encouraged
- Maternal hyperglycemia associated with delayed lactogenesis
- Glycemic control should receive much attention
- Episodes of hypoglycemia induces epinephrine release which causes temporary decrease in milk production
- Hypoglycemia is most likely to occur within an hour of breastfeeding - important time to measure BG
- Recommend snack before or during breastfeeding

Type 1 Diabetes and Breastfeeding

- Need to adjust/eliminate night time NPH to avoid nocturnal hypoglycemia
- Recommend BG checks at pre/post meals, bedtime and 2-3am
- Sweet Success Guidelines for Care recommends 1-2hr PP BG level of 150-155 mg/dl during the breastfeeding period
Type 2 DM and breastfeeding

• Breastfeeding is strongly encouraged
• Major concern for type 2 DM patients is the use of oral hypoglycemic agents and their effects in breast milk
• BG goal is the same as for type 1 DM patient
• Recommend check BG at fasting, 1-2hr PP, bedtime and occasional 2-3am.

Avoiding Maternal Hypoglycemia

• If BG <100 BEFORE feeding take 15g CHO and 7 g protein.
• If BG < 100 AFTER feeding consider 15 g CHO snack if insulin on board.
• Hypoglycemia causes release of epinephrine which can cause temporary decrease in milk production

Use of Oral Meds During Lactation

• AAP judged tolbutamide, a first generation sulfonylurea to be safe during lactation
• Studies showed that very small amounts of glipizide and glyburide passed into breast milk compared to metformin and both were found compatible with breastfeeding
• Metformin considered safe during breastfeeding. Only one long term study on infants (3-6months) suggested no significant difference in ht/wt or motor-social development.

**Other Medications**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ace inhibitors</td>
<td>Not recommended in the first 2wks of life</td>
</tr>
<tr>
<td>ARBs</td>
<td>Not studied</td>
</tr>
<tr>
<td>Beta blockers</td>
<td>Recommendation varies depending on the specific drug</td>
</tr>
<tr>
<td>Calcium Channel Blockers</td>
<td>Approved by AAP</td>
</tr>
<tr>
<td>Methyldopa</td>
<td>Approved by AAP</td>
</tr>
<tr>
<td>Statins: HMG CoA Reductase Inhibitors</td>
<td>Not recommended during lactation</td>
</tr>
</tbody>
</table>

*Hale T. Medications and Mother’s Milk. Pharmasoft Medical Publishing.

**Depression**

- Difficulties with breastfeeding is a flag for postnatal depression
- Depressed women tend to breastfeed less or for shorter duration
- Utilization of antidepressants with lactation – offspring are more resilient if mother continues medications and is able to latch...


**Breastfeeding and Psychiatric Medications**

- No formal guidelines regarding use of psychiatric meds including SSRI’s during pregnancy and lactation
- All meds are secreted into breast milk
- Incidence of adverse effects on nursing infants appears to be relatively low
- Long-term neurodevelopmental effects for infants not predictable
- Maternal-child relational difficulties in untreated depression are well documented
- Fluoxetine—the most studied SSRI in pregnancy; has long half-life and not recommended in BF
- Toxicity reported with mood stabilizers (lithium, carbamazepine and valproic acid)
- Info on use of antipsychotic drugs is limited
**Nutrients During Lactation**

- Dietary Protein and CHO has no major effect on breast milk.
- Fat-some effect by diet related to type of fat and maternal body composition (increased SFA and UFA in diet increases concentration in breast milk).
- Diet does not seem to alter the concentration of cholesterol and phospholipids in human milk.
- Diet consisting of <1,500 kcal/day have been shown to decrease milk volume in lactating women.
- If weight loss is desired, recommend that women aim for 4 1/2 lbs weight loss per month.

**Precautions**

- Breastfeeding is not birth control.
- For women with GDM - “progestin only birth control” can double to triple the diabetes rate in the first year of use.
- Diabetes is associated with Mastitis.
  - Contact healthcare providers for signs and symptoms.
- If using Medications for DM, caution per hypoglycemia with growth spurts (2 wks, 6 wks, 3 and 6 months).

**Weaning**

Reduce calories to prevent weight gain

May need to readjust medications.

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Examples of Feeding Cues

Infant Feeding Cues

• Turning of head
• Bringing hands to face
• Making licking, smacking or sucking movements
• Sucking hands or blanket
• Crying is a late sign of hunger making breastfeeding more difficult

“My breasts have now done more for humanity in a few minutes than I’ve done in roughly my life.”

• Breastfeeding Supporter
Questions??