MATERNAL NUTRITION DURING LACTATION
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PRESENTATION OBJECTIVES
At the end of the presentation, participants will be able to:
- Describe the nutritional demands of lactation.
- Provide evidence-based nutrition education to the lactating mother.
- Define the key aspects of special and/or restrictive diets.
- Apply sound diet counseling strategies that take into account each mother’s goals and barriers.
- List evidence-based nutrition resources for moms.

PRESENTATION OUTLINE
- Nutritional demands of lactation
- Guidelines for a healthy diet
- Restrictive diets and special considerations
- Allergies and intolerances
- Caffeine, alcohol, galactagogues, and probiotics
- Myths of breastfeeding
- Practical guidelines for providing nutrition recommendations
- Nutrition resources for moms
THE IMPORTANCE OF NUTRITION FOR MOMS

- Confused consumers = confused moms
- Importance “window” when moms are more interested in nutrition
- Maternal nutrition during pregnancy and lactation appears to have a substantial impact on offspring physiology and behavior by altering the abundance of prevalence of offspring gut microbiota in early life.* (Chuzel et al 2016)
- The Internet!

NUTRITIONAL DEMANDS OF LACTATION

CALORIES, PROTEIN, FLUID, VITAMINS & MINERALS

ENERGY DEMANDS OF LACTATION

CALORIES
- Pregnancy ~300 additional calories per day
- Lactation ~500 additional calories per day for the first 6 months and ~400 additional calories from 7-9 months (OM 2005, Skriver 2014)
- Increased with multiples
- Decreased with supplemental formula feeding
- Example of 500 calories is a peanut butter and jelly sandwich
### Protein & Fluid Needs of Lactation

- **Protein:** 1 gram per kilogram of normal body weight
  - Example: 150 pound woman (68kg) would need 62g protein/day.
- **Fluids:** 30 ml/kg body weight
  - Example: 150 pound woman (68kg) would need 2040 ml fluid/day (8.5 cups day).
  - Drinking more fluids is not linked to increased level of milk production (Duday et al 1985).
  - Urine should be a pale color.

### Micronutrient Needs for Lactation

- Increased vitamin/mineral needs as total calorie requirements increase.
- One-size-fits-all supplementation not required; although continuing prenatal vitamin use is optimal for most moms.
- Supplementing recommended to correct a deficiency (specific timeframe) or make up specific nutrients not consumed due to intolerance/aversion.
- Heavy over-supplementation is not recommended as toxicity can result.
- Water-soluble vs. fat-soluble.

### Diet's Effect on Milk Volume and Quality

- 2 sources of energy and nutrients used to make milk:
  - Mother's current diet
  - Mother's body stores laid down before and during pregnancy.
- Mild malnutrition does not affect *quantity* or *quality* of milk (Pratt et al. 1989).
- Diets providing less than 1500 kcal can cause maternal fatigue and lower milk volume (Shearer et al. 2004).
- Higher calorie intake may be a predictor of exclusive breastfeeding for 6 months period (Filo et al. 2012).
- Fat content of milk remains stable, but the types of fats vary based on mother's diet (Filo et al. 2012).
- Exercise does not change milk production or milk quality (Duday et al. 2012).
WHAT IS A HEALTHY DIET?

METABOLIC MISCONCEPTIONS

- Myth: Fat and sugar make you fat.
  
  **FACT:** More calories consumed than expended per day makes you gain weight.
  
  Weight Maintenance: Calories IN = Calories OUT

- Myth: Fats are bad.
  
  **FACT:** Fats are good. Fats help you feel full after a meal. Don’t avoid fats, but choose to eat them when they occur naturally in foods, examples: avocados, nuts and seeds, eggs, and meat versus manufactured fats in fried foods and savory snacks.

- Myth: We need more protein foods.
  
  **FACT:** Proteins are a part of most carbohydrates. For example grains, vegetables, legumes.

METABOLIC MISCONCEPTIONS (CONT'D)

- Myth: Adults need snacks to keep their blood sugars up.
  
  **FACT:** Adult bodies are designed to go 4-5 hours after a healthy mixed-source (carbs, proteins and fats) meal of ~1/3rd of daily calories. Snacking is unnecessary for most people, and elevates blood glucose, causing increases in insulin.

*Image: [Calories per Meal Chart](image-url)*
Key Recommendations

When considering dietary recommendations for healthy eating patterns, it is important to be mindful of the following:

1. Nutrition guidelines:
   - Whole grains
   - Lean protein sources
   - Fruits and vegetables
   - Dairy products
   - Healthy fats

2. Healthy eating patterns include:
   - A variety of fruits and vegetables
   - Whole grains
   - Lean protein sources
   - Low-fat or fat-free dairy products
   - Healthy fats

3. For lactating women, limit fish to <2x per week due to mercury content. Avoid pike, shad, long mackerel and swordfish.

4. Added Sugar Example:
   - 2000 calorie diet = 200 kcal of sugar = 50g
   - 1 tsp sugar = 4.2g sugar
   - 12 oz soda = 10 tsp sugar (42g sugar)
   - 12 oz sports drink = 5 tsp sugar (21g sugar)
<table>
<thead>
<tr>
<th>DAY 1</th>
<th>DAY 2</th>
<th>DAY 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
</tr>
<tr>
<td>1 cup strawberries</td>
<td>2 hard-boiled eggs</td>
<td>1 cup whole-grain cereal</td>
</tr>
<tr>
<td>2 pieces of whole-wheat toast</td>
<td>1 cup oatmeal with blueberries and milk</td>
<td>1 cup non-fat milk</td>
</tr>
<tr>
<td>with peanut butter</td>
<td></td>
<td>1 banana</td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td><strong>Lunch</strong></td>
<td><strong>Lunch</strong></td>
</tr>
<tr>
<td>Whole wheat half dipped in hummus;</td>
<td>Peanut butter and jelly sandwich</td>
<td>Grilled cheese sandwich</td>
</tr>
<tr>
<td>Yogurt</td>
<td>Cucumber and carrot sticks</td>
<td>Cup of tomato soup</td>
</tr>
<tr>
<td><strong>Snack</strong></td>
<td><strong>Snack</strong></td>
<td><strong>Snack</strong></td>
</tr>
<tr>
<td>2 Clementines</td>
<td>½ cup nut mix</td>
<td>Apple with peanut butter</td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td><strong>Dinner</strong></td>
<td><strong>Dinner</strong></td>
</tr>
<tr>
<td>Green salad with cut vegetables; 1 cup</td>
<td>Baked salmon with lemon-garlic sauce</td>
<td>Green side salad</td>
</tr>
<tr>
<td>chicken; 2 Tbsp sunflower seeds; 2 Tbsp</td>
<td>Brown Rice</td>
<td>Spaghetti with red sauce and 3</td>
</tr>
<tr>
<td>cranberries</td>
<td>Broccoli</td>
<td>meatballs</td>
</tr>
<tr>
<td>Strips of grilled marinated tofu</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Snack</strong></td>
<td><strong>Snack</strong></td>
<td><strong>Snack</strong></td>
</tr>
<tr>
<td>½ cup salad nuts and ½ cup raisin</td>
<td>Cantaloupe slices</td>
<td>Yogurt with berries</td>
</tr>
</tbody>
</table>

**QUICK SNACK IDEAS**

- Fruits
  - Apple slices with nut butter
  - Berries
  - Smoothies
  - Melon slices
  - Whole fruit
- Vegetables
  - Sticks plain or dipped in hummus
- Nuts
  - Raw nuts
  - Trail mix
  - Yogurt
- Cereals
  - Oatmeal or cereal
  - Chickpeas
  - Hard-boiled eggs

**WORDS OF WISDOM**

- "Don’t eat anything your great-grandmother wouldn’t recognize as food."
- "If it came from a plant, eat it. If it was made in a plant, don’t."
- "Eat only foods that will eventually rot."

(From the book “Food for Life” by Dr. Kathleen DesMaisons and Matt Myers, 2009)
**COMMON SENSE ADVICE FOR MOMS**

- Don’t avoid any particular foods
- Eating a wide range of foods while breastfeeding helps to develop baby’s palate for later in life
- Eat 5 fruits and vegetables each day
- Don’t count calories, just focus on healthy food choices
- Drink when you feel thirsty and when you feed the baby
- Continue taking a prenatal vitamin as “insurance”

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**RESTRICTIVE DIETS & SPECIAL CONSIDERATIONS**

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**RESTRICTIVE DIETS**

- Vegan or Macrobiotic diets
  - B12 should be supplemented for women not eating animal products
- Lactose Intolerant
  - Other sources of Calcium should be emphasized
- Celiac Disease – Prevalence ~1% of the population
  - Breastmilk from Celiac disease mothers has reduced immune protective compounds vs. healthy mothers (Oliveras et al. 2015)
  - Neither timing of gluten introduction nor breastfeeding duration have an impact on Celiac disease risk in predisposed population (NASCO 2016)
**Restrictive Diets (Cont'd)**

- Fast diets
  - Alkaline, Kato, Paleo
  - Low carbohydrate means higher intake of saturated and high protein
  - Overall lower calorie
  - Low in antioxidants, phytochemicals, fiber and vitamins and minerals due to restrictions in fruits and vegetables
  - High-protein diets are depleting
  - Cleansing diets
  - Note: Carbohydrate imbalances, vitamin/mineral deficiencies and are too low in calories

- Diabetic diets
  - Improved glycemic control in the early days
  - Impact of poorly controlled glucose during pregnancy and at birth - low blood sugars, delayed engagement, still-birth, early supplementation?
  - Treatment: Consistent carbohydrate diet and exercise

**Special Considerations**

- Teens - diets generally contain less iron and their needs are higher*
- Low-income women - less Vitamin A and Calcium (OM 1993)
  - Higher level of education usually improves diet quality
  - Lack of money may limit ability to purchase healthful foods as well as facilities to prepare or store food
  - Provide resources for food-assistance programs (WIC)
- Resources:
  - WIC - local lactation support services
  - Dial 211 - community resources

**Allergies & Intolerances**
IS BABY REACTING TO MY MILK?

- Symptoms: "Gassy" "Fussy" "Colicky"
- Rule out:
  - Normal newborn behaviors - reverse cycling/stutter feeding/delay for drainage, somnolence, fussiness
  - Oral restrictions (Kellow 2011)
  - Anosmia syndrome prevalence of 0.3-12.7% (Segal et al. 2007)
  - Rapid milk ejection reflex (MER)
  - Gastroesophageal Reflux Disease (GERD)
  - Gastroesophageal-reflux without distress occurs in 1-3% of otherwise healthy infants (Lightdale 2013) - "happy option"
  - GERD prevalence in lower in breastfed infants
  - Note: "Fussy" but not overtly fussy often during first 2 months of life and thus resolves without intervention in 95% of infants by 6 months of age. (Karol and Donald 2010)
  - When other potential causes have been ruled out, elimination diet for suspected "trigger" food
  - 2 week time period

INCIDENCE & SYMPTOMS OF ALLERGY

- Allergy is an immune system response
- In the first year of life, an estimated 2.7% of infants allergic to cow's milk protein (Kuwahara et al. 2006)
  - Exclusively breastfed infants prevalence is 0.5-1% (AHR 2011)
  - Symptoms may start in the first weeks of life and most symptoms observed between 1-4 months of age (Kuwahara et al. 2008)
  - Parental allergies increase infant allergy risk (Ferrella 2007)
  - One parent with allergies, infant has 24-40% risk; two parents with allergies, infant has 50-80% risk
  - Allergy symptoms in otherwise healthy child (Kuwahara et al. 2006)
  - Gastrointestinal: Bloody stools (most common), vomiting, diarrhea - present in 50-60% of cases
  - Skin problems: eczema, dermatitis, rash, hives - present in 50-60% of cases
  - Respiratory problems: congestion, runny nose - present in 20-30% of cases
  - Crying during or after feeds

TREATMENT FOR ALLERGY

- Eliminate the most likely suspect - Cow’s milk protein
  - Some babies will have improvement in the first few days, but it can take 2-4 weeks (AHR 2011)
- Keep it as simple as possible and recommend alternatives to commonly consumed foods
  - Remember to ask about "hidden" sources
- Then look to other potential allergens if no improvement
  - Soy, citrus, fruits, eggs, nuts, peanuts, wheat, corn, strawberries and chocolate*
CAFEINE, ALCOHOL, GALACTOGOGUES & PROBIOTICS

CAFFEINE

- Caffeine is not easily metabolized by preterm or ill babies (Hal 2017)
- High maternal intake can lead to wakefulness and/or irritability
- Dose to infant is 0.05-1.5% of maternal dose
- Chronic use during the neonatal period can cause affect
- 300mg or less per day is usually tolerated
  - 8oz coffee contains 100-150mg caffeine
  - 8oz tea contains 30-60mg caffeine
ALCOHOL

- Peak breastmilk alcohol levels reached at 30-60 minutes with empty stomach and 60-90 minutes when consumed with food (Haw 2017)
- 2 hours for each drink consumed
- High-use symptoms: sedation, low milk supply, poor feeding, altered milk taste

GALACTOGOGUES

- Definition: Milk-enhancing substances
- Galactogogues are only effective with breast drainage
  - Medications: Domperidone, Metoclopramide (Reglan)
  - Herbs: Fenugreek, Blessed (Milk) Thistle
  - "Because current research of all galactogogues is relatively inconclusive and all of the agents have potential adverse effects, AIBM Cannot recommend any specific pharmacologic or herbal galactogogues at this time" (AIBM 2011)
- Foods that boost supply?
  - Oatmeal, flaxseed, brewers yeast, fennel, garlic, etc., etc.

PROBIOTICS & PREBIOTICS

- Probiotics: Substances that contain microorganisms that alter the gut microflora
  - Food sources: Yogurt, fermented foods like tempeh, miso, sauerkraut, kimchi
- Prebiotics: Supplements that contain non-digestible foods for bacteria
  - Human milk contains prebiotics - human milk oligosaccharides (HMOs)
  - Probiotic Lactobacillus reuteri reduced cry time in breastfed infants vs. treatment with simethicone (Kooi et al 2012)
- "More studies are required to establish the safety and efficacy of probiotic and prebiotic products in children. To date, these products seem to be safe for healthy infants and children." (AAP 2010)
“Combined results of various studies suggest that some bacteria present in the maternal gastrointestinal tract could reach the mammary gland during late pregnancy and lactation through a mechanism involving intestinal immune cells. Thus, modulation of the maternal gastrointestinal microbiota during pregnancy and lactation could have a direct effect on infant health via their incorporation into milk.” (Kozi et al 2014)

MYTHS OF BREASTFEEDING NUTRITION

• “Spicy or gassy foods like onions, broccoli and cabbage can make your baby fussy.”
• “A mother must drink milk to make milk.”
• “Poor milk supply is usually caused by not eating and/or drinking enough.”
• “Some babies are allergic to their mother’s milk.”

COUNSELING “HOW-TO”

• Recognize mom’s priorities and goals
  - Concerns about infant nutrition? Concern about infant behavior? Concerns about milk production? Return to pre-pregnancy weight? Mom’s own nutritional status?
• Recognize the difficulty of diet change from normal habits – Keep it simple!
  - Individualize plan
  - Emphasize small steps
  - Set up timeframe to check back
• Focus on basic nutritional information using research-based principles
  - Avoid personal bias and trenddrifts
NUTRITION RESOURCES FOR MOMS

- Dietary Guidelines for Americans: www.dietaryguidelines.gov
- MyPlate: www.choosemyplate.gov
- WHO Nutrition: http://www.who.int/nutrition/en/
- DASH Diet: https://www.nhlbi.nih.gov/health-topics/dash-eating-plan
- Academy of Nutrition & Dietetics: www.eatright.org
- Mayo Clinic Ingredient Substitutions: https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/healthy-recipes/art-20047195