The Burden of Not Breastfeeding

Effect of Breastfeeding on Chronic Disease

Misty Virmani, MD FAAP

Assistant Professor of Pediatrics in Neonatology
No Disclosures
Breastfeeding is nutritionally, immunologically, neurologically, endocrinologically, economically, and ecologically superior to formula...

-The Lancet 2016 McFadden et. Al.
Objectives

- List 3 ways in which breastfeeding impacts the health of mothers
- List 3 ways in which breastfeeding impacts the health of infants
- Describe 2 ways in which improving rates of breastfeeding impacts societal health
State of Arkansas’ Health

- 42nd in nation in diabetes - 11.2% of population
- Top 5 highest obesity rate - >35% of the population
- 3rd highest stroke rate in US - 3.8%
- 3rd highest rate of death related to cardiovascular disease - 223.7 per 100,000

- Arkansas has the 3rd lowest breastfeeding rate
Age-adjusted Prevalence of Obesity and Diagnosed Diabetes Among US Adults

**Obesity (BMI ≥30 kg/m²)**

- **1994**
  - No Data
  - <14.0%
  - 14.0%-17.9%
  - 18.0%-21.9%
  - 22.0%-25%
  - >25%

- **2000**
  - No Data
  - <14.0%
  - 14.0%-17.9%
  - 18.0%-21.9%
  - 22.0%-25%
  - >25%

- **2015**
  - No Data
  - <14.0%
  - 14.0%-17.9%
  - 18.0%-21.9%
  - 22.0%-25%
  - >25%

**Diabetes**

- **1994**
  - No Data
  - <4.5%
  - 4.5%-5.9%
  - 6.0%-7.4%
  - 7.5%-8.9%
  - >8.9%

- **2000**
  - No Data
  - <4.5%
  - 4.5%-5.9%
  - 6.0%-7.4%
  - 7.5%-8.9%
  - >8.9%

- **2015**
  - No Data
  - <4.5%
  - 4.5%-5.9%
  - 6.0%-7.4%
  - 7.5%-8.9%
  - >8.9%

CDC’s Division of Diabetes Translation. United States Surveillance System available at http://www.cdc.gov/diabetes/data
## Top 10 causes of death in females in the US

<table>
<thead>
<tr>
<th>All Females, All Ages</th>
<th>Percent*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Heart disease</td>
<td>22.3</td>
</tr>
<tr>
<td>2) Cancer</td>
<td>21.1</td>
</tr>
<tr>
<td>3) Chronic lower respiratory diseases</td>
<td>6.2</td>
</tr>
<tr>
<td>4) Stroke</td>
<td>6.1</td>
</tr>
<tr>
<td>5) Alzheimer's disease</td>
<td>5.7</td>
</tr>
<tr>
<td>6) Unintentional injuries</td>
<td>4.0</td>
</tr>
<tr>
<td>7) Diabetes</td>
<td>2.7</td>
</tr>
<tr>
<td>8) Influenza and pneumonia</td>
<td>2.3</td>
</tr>
<tr>
<td>9) Kidney disease</td>
<td>1.8</td>
</tr>
<tr>
<td>10) Septicemia</td>
<td>1.6</td>
</tr>
<tr>
<td>AR Leading Causes of Death, 2014</td>
<td>TDeaths</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>1. <strong>Heart Disease</strong></td>
<td>7581</td>
</tr>
<tr>
<td>2. <strong>Cancer</strong></td>
<td>6546</td>
</tr>
<tr>
<td>3. <strong>Stroke</strong></td>
<td>1583</td>
</tr>
<tr>
<td>4. <strong>Chronic Lower Respiratory Diseases</strong></td>
<td>1458</td>
</tr>
<tr>
<td>5. <strong>Accidents</strong></td>
<td>1193</td>
</tr>
<tr>
<td>6. <strong>Alzheimer's Disease</strong></td>
<td>828</td>
</tr>
<tr>
<td>7. <strong>Diabetes</strong></td>
<td>710</td>
</tr>
<tr>
<td>8. <strong>Influenza/Pneumonia</strong></td>
<td>672</td>
</tr>
<tr>
<td>9. <strong>Kidney Disease</strong></td>
<td>550</td>
</tr>
<tr>
<td>10. <strong>Septicemia</strong></td>
<td>515</td>
</tr>
</tbody>
</table>
By 2023...

- Arkansas will spend $7 billion dollars treating patients with chronic disease
- $34 billion will be lost due to decreased productivity related to chronic disease
- At present, Arkansas’ work force ranked 48th in the US in health indexes
So how does all this relate to breastfeeding?
Mammogenesis and Lactogenesis

- Final stages of mammogenesis occurs in pregnancy
- Lactogenesis occurs as a mother transitions from a pregnant state to a postpartum/lactating state
- Maternal hormones play a critical role in lactogenesis
- Disruption of *physiologically intended function* leads to adverse outcomes
Pregnancy

- Maternal metabolic system changes
  - Increased accumulation of visceral fat
  - Increased insulin resistance
  - Elevated circulating lipid levels
“Reset” hypothesis

- Breastfeeding mobilizes these accumulated stores
- Longer breastfeeding duration more completely depletes these stores
- Prolonged breastfeeding is associated with
  - Improved B-cell function
  - Favorable cardiovascular risk factors
  - Lower risk of hypertension
  - Lower risk of Type 2 Diabetes
Mother: Anemia

- Early postpartum and continued breastfeeding helps the uterus return to pre-partum size
- Reduces blood loss and risk of post-partum hemorrhage
Mother: Cardiovascular disease

- Synthesis of breast milk, particularly lipid globules, removes triglycerides and cholesterol from maternal serum
- Stimulates increased high-density lipoprotein synthesis
- Metabolizes very low density lipoprotein complexes
- Lower serum lipid levels
Mother: Cardiovascular disease

- Suggestion of dose-dependent decrease in hypertension for breastfeeding > 12 months
- >3 months breastfeeding protective against aortic calcification (never breastfed OR 5.26 compared)
- >23 months breastfeeding - lower odds of MI (HR 0.63)
- Parous women who have never breastfed - at <65yrs have increased risk of cardiovascular mortality (HR 2.86)
Mother: Cardiovascular disease

- When compared to parous women who have never breastfed
  - 12% lower risk of major cardiovascular disease

- Regarding CVD duration of breastfeeding matters:
  - 0-6 months  1% lower risk
  - 6-12 months  7% lower risk
  - 12-18 months  11% lower risk
  - 18-24 months  13% lower risk
  - >24 months  18% lower risk
    - Each additional 6 months - 4% risk reduction
Mother: Hypertension

- Conflicting results
  - >12 months breastfeeding associated with short term lower blood pressures, OR 0.88
  - Some studies demonstrate the effect mitigated by 10 years post last delivery
  - Blood pressures slightly lower when adjusted for confounders at >65, but are not statistically significant
Mother: Cerebrovascular disease

- When compared to parous women who have never breastfed
  - 9% lower risk of stroke
  - 12% lower risk of ischemic stroke

- Regarding stroke, *duration of breastfeeding matters* with each additional 6 months adding a 3% risk reduction
Mother: Metabolic impact

- 50% of women with gestational diabetes will be diagnosed with Type 2 Diabetes within 5-8 years
- Decreased risk of Type 2 diabetes by 14-15% when compared to parous women who have never breastfed
- Risk reduction appears to be dose dependent (though non-linear)
- Lactation was an independent predictor of increased insulin sensitivity, higher glucose tolerance, and decreased insulin levels
  - In some studies decreasing risk of T2DM by 30-40%
Large meta-analysis showed 30% reduction in ovarian cancer associated with longer breastfeeding duration (<18 months)

For every 12 months breastfeeding there is a cumulative 4.3% decrease in risk of breast cancer
Long term effect on the breastfed infant
Breastfeeding and Infant health

- Decreased risk of death in the first year of life by 21%
  - Risk of SIDS (by 50%)
  - Risk of chronic illness: asthma, allergies, colitis
  - Risk of leukemia and lymphoma
  - Risk of hospitalization due to GI and respiratory illness
  - Risk of emergency/ill doctors visits: otitis, respiratory, asthma, GI infection/ailments
Infant: cardiovascular effects

- Formula fed infants higher levels of inflammatory markers associated with atherosclerotic disease in adults

- Higher childhood cholesterol and LDL profiles associated with non-breastfed and partially breastfed infants compared to exclusively breastfed infants
Infant: Obesity and Diabetes

- Decreased risk of obesity, OR 0.76
  - Compared “ever breastfed” to never breastfed

- Decreased odds of Type 2 Diabetes, OR 0.65
  - Compared “ever breastfed” to never breastfed
  - Better risk reduction associated with exclusive breastfeeding and longer duration of breastfeeding
Infant: Inflammatory Bowel Disease

- Crohn’s disease OR 0.45
  - Associated with any breastfeeding

- Ulcerative colitis, OR 0.56
  - Associated with any breastfeeding
Infant: Asthma and Allergy

- Genetic predisposition plays a heavy role

- Breastfeeding mediates severity of disease
  - Reduced wheezing up to 15% with exclusive breastfeeding

- Fewer respiratory hospitalizations in breastfed infants, RR 0.68
Infant: Childhood Cancer

- Any breastfeeding reduced risk of acute lymphoblastic leukemia, OR 0.82

- Breastfeeding 6 months (any amount) risk reduction
  - Acute myelogenous leukemia, OR 0.85
  - Acute lymphoblastic leukemia, OR 0.81
Infant: Ongoing study

- Breastfeeding in infancy
  - Reduces risk of multiple sclerosis
  - Reduced risk of juvenile idiopathic arthritis
  - Mediates autoimmune potential
    - Reduced risk of Type 1 diabetes
    - Immune mediated gastrointestinal disease

- Microbiomic dysbiosis determinants of long term health
The cost of suboptimal breastfeeding
Real differences

- Increased breastfeeding rates
  - In US save >900 lives annually

- Worldwide prevent 823,000 childhood (<5yrs old) deaths annually

- Worldwide prevent 20,000 deaths from breast cancer
Real cost

- Annual cost
  - 4981 excess cases of breast cancer
  - 53,847 excess cases of hypertension
  - 13,946 excess cases of myocardial infarction

- Cost $17.4 billion related to premature (<70) death of women
- $733.7 million in direct healthcare costs for women
- Save $13 billion dollars in healthcare costs for infants/children
Importance of breastfeeding

- Societal health
  - Fewer missed days of work for breastfeeding mothers
  - Fewer sick visits to doctors and ER
  - Better long term societal health indexes
  - Fewer deaths from preventable causes
  - Decreased healthcare costs
advocacy

- Support Baby Friendly Hospital Initiatives
- Encouraged by American Academy of Pediatrics, American College of Obstetric and Gynecologists, World Health Organization, Centers for Disease Control, National Institute of Health, Institute of Medicine....
- Tool kit produced by ACOG for obstetrician advocacy in the prenatal setting
  - [http://www.acog.org/About-ACOG/ACOG-Departments/Toolkits-for-Health-Care-Providers/Breastfeeding-Toolkit](http://www.acog.org/About-ACOG/ACOG-Departments/Toolkits-for-Health-Care-Providers/Breastfeeding-Toolkit)
What everyone can do

- Support ALL breastfeeding mothers
  - Employees
    - Time/space to pump - have a policy
    - Minimum 6 weeks maternity leave
  - Patients
    - Breastfeeding friendly office space
    - Encourage pregnant patients to breastfeed
    - DON’T discourage due to medications/medical conditions
      - Consult lactation consultant
      - Infant Risk Center 806-352-2519
Thank You!!!
References