Food Insecurity & Health

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Objectives

1. Briefly describe associations between food insecurity and health among children and adults

2. Using diabetes as a case example, discuss the intersection between food insecurity and chronic disease
Food Insecurity Among Children

- Low birth weight & birth defects
- Anemia due to iron deficiency
- Colds & stomachaches
- Cognitive delay & poor educational outcomes
- Mental health symptoms
- Increased utilization of health care (outpatient, psychiatric, Emergency Room)
- Obesity??
Food Insecurity Among Adults

- Obesity (women only)
- Diabetes
- Heart disease
- Depression and fatigue
- Poor health status
Diabetes: Blood Sugar Balance

• Drive Blood Sugar Up
  Food
    – Carbohydrates
      • Sugars, starches, (& fiber)

• Drive Blood Sugar Down
  Lack of food
  Diabetes medicine (pills or insulin injections)
  Physical Activity

HYPERGLYCEMIA:
  Blindness
  Amputations
  Kidney Failure

HYPOGLYCEMIA:
  Poor quality of life
  Cognitive dysfunction
  Seizures
  Coma
  Death
Diabetes Self-Management

• Reliable access to food
• Diabetes-appropriate foods
  – Vegetables (and fruits)
  – Protein
  – Limited carbohydrates
Cycle of Food Insecurity & Chronic Disease: Diabetes

- Food Insecurity
- Worsening of Competing Demands
- Increased Health Care Utilization
- Increased Diabetes Complications
- Poor Diabetes Control
- Poor Self-Management Capacity
- Cycles of Food Adequacy/Inadequacy
- Competing Demands

Cycles of Food Adequacy and Inadequacy

Compensatory Strategies during Food Adequacy
- Avoidance of food waste
- Systematic overconsumption

Compensatory Strategies during Food Shortage
- Skipped meals
- Reduced caloric intake

Hyperglycemia

Hypoglycemia

Hypoglycemia & Food Access

- Inpatients (urban, safety net hospital)
  - 1/3 of those who reported hypoglycemia attributed it to the inability to afford food

- Outpatient (community health centers): 38% food insecure
  - Blood sugar ever gotten too low because you couldn’t afford food (33% FI vs 5% FS)
  - Ever been to the ER because your blood sugar was too low (28% FI vs 5% FS)

Of the 711 participants, 197 (28%) reported at least one significant hypoglycemic episode in the previous year.

*Adjusted model includes age, race/ethnicity, tobacco use, English proficiency, income, educational attainment, body weight, insulin, renal disease, adherence to medication and blood glucose testing, comorbid conditions, and alcohol abuse.

# Risk Factors for Hypoglycemia

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Adjusted OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Insecurity</td>
<td>3.0 (1.5-5.9)</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>2.2 (1.1-4.5)</td>
</tr>
<tr>
<td>Comorbid illnesses</td>
<td>1.5 (1.1-2.0)</td>
</tr>
<tr>
<td>Obesity</td>
<td>0.3 (0.1-0.7)</td>
</tr>
</tbody>
</table>

Not significant: renal disease, insulin use, hypoglycemia knowledge, English proficiency, age, race/ethnicity, education, income, tobacco use, glucose monitoring, and medication adherence

Cycles of Food Adequacy and Inadequacy

Compensatory Strategies during Food Adequacy
- Avoidance of food waste
- Systematic overconsumption

Compensatory Strategies during Food Shortage
- Skipped meals
- Reduced caloric intake

Hyperglycemia

# Food Insecure Adults with Diabetes Have Higher Average Blood Sugars

<table>
<thead>
<tr>
<th></th>
<th>Food Secure</th>
<th>Food Insecure</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean HbA1c (ICH C, n=711)</strong></td>
<td>8.1%</td>
<td>8.5%</td>
<td>0.007</td>
</tr>
<tr>
<td><strong>Mean HbA1c (MFFH, n=621)</strong></td>
<td>7.8%</td>
<td>8.4%</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Food Insecure Adults with Diabetes Have Higher Average Blood Sugars

Seligman, *Diabetes Care, 2012.*
Cycle of Food Insecurity & Chronic Disease: Diabetes

- Food Insecurity
- Cycles of Food Adequacy/Inadequacy
  - Poor Self-Management Capacity
  - Competing Demands
- Worsening of Competing Demands
- Increased Health Care Utilization
- Poor Diabetes Control
- Increased Diabetes Complications

Poor Self-Management Capacity

• Constrained dietary options
  – Decreased dietary variety
  – Increased fats, refined sugars
  – Increased sodium
  – Decreased fruits and vegetables and dairy

• (Decreased physical activity)
“The end of the month, I start getting out of food...but I have to eat something, ‘cause if I don’t eat behind my [insulin] shot, that shot will make you so sick. I just eat anything I can find during that time just to keep me from getting sick.”

Wolfe, J Aging Health, 1998
## Patient-Related Factors Related to Higher Blood Sugar

<table>
<thead>
<tr>
<th></th>
<th>Food Insecure (n=325)</th>
<th>Food Secure (n=386)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty following a diabetic diet, %</td>
<td>64.3</td>
<td>49.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Confidence in ability to manage their diabetes, mean score</td>
<td>7.1</td>
<td>7.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Emotional distress related to diabetes, mean score</td>
<td>3.9</td>
<td>3.0</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Cycle of Food Insecurity & Chronic Disease: Diabetes

Increased Need for HC Visits

• Food insecure adults have about 5 more physician encounters per year than food secure adults
• Hospitalizations in past year: 13% FI vs 8% FS
• ED visits in past year: 28% FI vs 19% FS
Competing Demands

• Hunger in America 2010: 34% of clients reported having to choose at least once in the last 12 months between paying for food and paying for medicine or medical care

• Food insecure patients more likely to put off buying blood testing supplies in order to afford food

Seligman, JHCPU, 2010
Other Diet-Sensitive Chronic Conditions

- Obesity
- High blood pressure (salt)
- Congestive heart failure (salt)\*
Food Insecurity

Poor Health
Feast-Famine in Animal Studies

- Preference for calorically dense foods
- Food hoarding
- Aggression
- Increase in body fat
- Quicker weight gain with refeeding

# Constrained Dietary Options

<table>
<thead>
<tr>
<th></th>
<th>Weight Gain</th>
<th>Diabetes</th>
<th>Iron Def Anemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased fats, refined sugars</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Reduced fruits, vegetables, and dairy</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reduced micronutrient intake</td>
<td>?</td>
<td>?</td>
<td>X</td>
</tr>
</tbody>
</table>

Bhattacharya, 2004; Kendall, 1996; Olson, 1999; Tarasuk, 2001; Tarasuk, 1999; Dixon, 2001; Lee, 2001
Thank You

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