Undernourished and Overweight: The link between food insecurity and obesity

MN AAP Hot Topics in Pediatrics
June 13, 2014

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Disclosures

- I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity.

- I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.
Objectives

- Define the relationship between obesity and food insecurity in the US, and globally
- Describe potential explanatory etiologies for an obesity-food insecurity relationship
- Consider how this knowledge informs clinical care and guides interventions
Definitions

- **Hunger**: physiologic condition
  - caused by recurrent or involuntary lack of food
  - potential, although not necessary, consequence of food insecurity.

- **Food insecurity**: limited/uncertain availability
  - of nutritionally adequate or safe food
  - Measured by 18 item USDA Food Security Module
Household Food Security/Insecurity Questions

18 Questions measure:
ANXIETY - household food budget/supply inadequate
PERCEPTIONS - food eaten was inadequate in quality/quantity
REPORTED INSTANCES - reduced food intake/consequences (sensation of hunger, reported weight loss), in ADULTS of household
REPORTED INSTANCES - reduced food intake/consequences for CHILDREN in households
COPING ACTIONS - augment food budget/supply (e.g. borrow money, get food from emergency pantries)
USDA Household Food Security Measure (2006)

Food Security: 0-2 Positive Responses

Low Food Security: 3-6 Positive Responses

Very Low Food Security: 6+ Positive Responses
Children’s Food Security

- Child Hunger Scale
- 8 Child Referenced of 18 Household Questions
- $2/8 = \text{Child Food Insecurity}$
Household Food Insecurity in US

The prevalence of food insecurity has been essentially unchanged since 2008

Percent of households

Food Insecurity (including low and very low food security)

Very low food security

HCMC Food Insecurity

- 2007: 35.2%
- 2008: 32.1%
- 2009: 28.8%
- 2010: 40.5%
- 2011: 39.7%

Household Food Insecurity
Pediatric Health Consequences of Food Insecurity

- Micronutrient deficiencies – anemia
- More illness burden – headaches, stomachaches
- More hospitalizations
- Behavioral changes – irritability, depression
- Developmental delays and poor school performance
- Weight status???
The Whole World Has A Weight Problem, New Report Says

Obesity in America

Total Percentage of Obese Adults

32.8%

Men: 31.7%
Women: 33.9%
Children: 25.8%

By The Numbers

13% Increase Since 2010
$147 Billion Spent Annually to Treat Obesity

Numbers courtesy of the CDC
Obesity* by Age and Race/Ethnicity
NHANES 2007-2008

*Gender – and age-specific BMI ≥ the 95th percentile
Adapted from Ogden et al. *JAMA*. 2010;303:242.
Federal health authorities on Tuesday reported a 43 percent drop in the obesity rate among 2- to 5-year-old children over the past decade.

“This is the first time we’ve seen any indication of any significant decrease in any group,” said Cynthia L. Ogden, a researcher for the Centers for Disease Control and Prevention.
Prevalence of Childhood and Adult Obesity in the United States, 2011-2012

Cynthia L. Ogden, PhD; Margaret D. Carroll, MSPH; Brian K. Kit, MD, MPH; Katherine M. Flegal, PhD

- Overall, no significant change 2003-2004 to 2011-2012 in high w/l among infants and toddlers, obesity in 2- to 19-year-olds, or obesity in adults.
- There was a significant decrease in obesity among 2- to 5-year-old children (from 13.9% to 8.4%; P = .03) and a significant increase in obesity among women aged 60+ years (from 31.5% to 38.1%; P = .006).
- Conclusions: Overall, there have been no significant changes in obesity prevalence in youth or adults between 2003-2004 and 2011-2012. Obesity prevalence remains high and thus it is important to continue surveillance.

JAMA. 2014;311(8):806-814
Obesity by Age, Sex, and SES
1999-2002 NHANES

Adapted from Wang and Zhang. Amer J Clin Nutr. 2006;84:707
Obesity for 2-9 Year Old Boys by SES and Ethnicity 1999-2002 NHANES

Percentage

White: 15.5 (Low SES), 8.7 (Medium SES), 14.9 (High SES)
Black: 12.9 (Low SES), 11.6 (Medium SES), 18.6 (High SES)
Hispanic: 21.3 (Low SES), 15.9 (Medium SES), 18.5 (High SES)

Adapted from Wang and Zhang. *Amer J Clin Nutr.* 2006;84:707
Obesity for 10-18 Year Old Girls by SES and Ethnicity 1999-2002 NHANES

* p<.05  Adapted from Wang and Zhang. *Amer J Clin Nutr.* 2006;84:707
Household Poverty is Associated with Both Food Insecurity and (sometimes) Childhood Obesity.

But:

Does Hunger (independent of other shared demographic factors) Cause Childhood Obesity?
First Hunger Study, 1994

Figure Legend: Mean (and 95% confidence intervals) National Center for Health Statistics growth percentiles by hunger status.

Other Child Hunger/Obesity Studies

- Low Family Income and Food Insufficiency in Relation to Overweight in U.S. Children. Is This a Paradox? Alaimo K, Olson CM, Frongillo EA. Arch Pediatr Adolesc Med. 2001;155:1161. *NOT SHOWN in most groups*

- The Association of Child and Household Food Insecurity Childhood Overweight Status Casey et al. Pediatrics. 2006;118:e1407-e1413 *AMONG MANY BUT NOT ALL*

Conclusion – For Children

- The association of food insecurity and overweight/obesity may differ by age, by measurement tool, by data set and time, and by race/ethnicity
- More research is required
Adult Studies Of Food Insecurity And Obesity

Studies reveal a stronger relationship most consistently shown for women – much less so for men, but also varies across different ages and race/ethnicity.
Higher fat foods may be eaten to increase satiety when there is not enough money to buy food.

Obesity may be an adaption to intermittent periods of hunger.

Economic Frameworks
Cheap Food is Poor Quality

- Composed of low-cost, but energy dense foods – energy largely supplied by fat, sugar, refined grains, potatoes, beans

- Energy dense foods are highly accessible, advertised heavily and deceptively, and delicious
  - Drewnowski A, Darmon N. Am J Clin Nutr 2005;82(suppl):265S

- Furthermore, these foods are scientifically designed to promote overconsumption
Economic Frameworks
Inadequate Benefits And Supply

• Cost of a Healthy Diet: Coming Up Short
  – Max SNAP benefit for family of 4
  – $2500 short of purchase price of TFP in Boston
  – $3200 short of purchase price of TFP in Philadelphia

• Feeding America Meal Gap data
  – 100 million missing meals in MN
Fast Food Industry As An Employer

- 52% of the families of front-line fast-food workers are enrolled in one or more public programs, compared to 25% of the workforce as a whole
  - Fast Food, Poverty Wages: The Public Cost of Low-Wage Jobs in the Fast-Food Industry
  - October 15, 2013, by Sylvia Allegretto, Marc Doussard, Dave Graham-Squire, Ken Jacobs, Dan Thompson and Jeremy Thompson at UC Berkley Labor Center

- Out of all industries, the fast food industry employs the highest rate of low-wage workers, has the highest employee turnover rates, and pays minimum wage to more of its employees than any other industry
  - Fast Food Nation, Eric Schlosser, 2001
Political Debate: Quality vs Cost

- **2010**, Congress directs the Agriculture Department to make school meals healthier. USDA soon issues expert-recommended standards that require, for example, more vegetables and whole grains and less sodium and fat
  
  - **5/29/14**: House Appropriations Com votes 31-18 to allow waivers to schools showing lunch programs operated at a net loss for over six months

- **2009**, WIC package changes, the result of an 8 year IOM/USDA collaboration of rigorous, science-based review
  
  - Spring 2014 - Congress inserts language in the 2014 Agriculture Appropriations bill to include white potatoes in the package
Food Advertising

- US fast-food chains like McDonalds, Wendy's, and Burger King - $4.6 Billion
- McDonald’s - $972 million
- All fruit, vegetable, bottled water, and milk combined - $367 million
- Center for Nutrition Policy and Promotion, the USDA’s sub-agency that “works to improve the health and well-being of Americans by developing and promoting dietary guidance that links scientific research to the nutrition needs of consumers,” - proposed budget of $8.7 million in 2013
- Social media
  - Rudd Center for Food Policy & Obesity at Yale University
Physical Activity

Limitations of cost, space, access, and safety

Plus

A culture of PA that values competition and winning

Vs

Cheapest form of entertainment with multi-channel, multi-media constant availability of potentially addictive screen time
Biologic Alteration of Metabolism

- “Toxic Stress” in childhood – cortisol levels
- Hunger during pregnancy, pre-conception health – fetal programming, greater risk of adult disease in SGA babies
- Impact of alternating periods of access and lack of access
- Maternal gestational diabetes – inter-generational biology of blood glucose metabolism
Altered Relationship With Food

- Disordered eating due to either current or historical personal experience of food insecurity
- Food as reward, comfort, relief of stress or boredom, typically of poor nutritional quality
- Inter-generational
Implications For Practice - What Can Pediatric Providers Do?

Screen for food insecurity, the Hunger Vital Sign:

- Within the past 12 months we worried whether our food would run out before we got money to buy more.
- The food we bought just didn’t last and we didn’t have money to get more.

Positive if either or both answered often or sometime true

Hager et al, 2010 Pediatrics 126(1)
# SNAP and WIC

<table>
<thead>
<tr>
<th></th>
<th>SNAP</th>
<th>WIC</th>
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<tbody>
<tr>
<td><strong>Funding</strong></td>
<td>USDA ($72 Billion)</td>
<td>USDA ($7.2 Billion)</td>
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<tr>
<td><strong>Population</strong></td>
<td>44.7 million Seniors, disabled, families</td>
<td>8.9 million Pregnant and postpartum</td>
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<tr>
<td></td>
<td>with children, limited access for able</td>
<td>women, infants, children up till age five</td>
</tr>
<tr>
<td></td>
<td>bodied adults without dependents</td>
<td></td>
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<tr>
<td><strong>Eligibility</strong></td>
<td>165% FPL</td>
<td>185% FPL and/or Adjunct Eligibility</td>
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<tr>
<td></td>
<td></td>
<td>from MA, MNCare, SNAP, MFIP, Fuel</td>
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<td></td>
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<td>Assistance, Reduced/Free School Lunch,</td>
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<td></td>
<td></td>
<td>or Headstart. MA is 275% FPL for</td>
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<td></td>
<td></td>
<td>pregnant women and 280% children under</td>
</tr>
<tr>
<td></td>
<td></td>
<td>age two, 150% children ages 2 to 18.</td>
</tr>
<tr>
<td><strong>Program Focus</strong></td>
<td>Food program</td>
<td>Health program</td>
</tr>
<tr>
<td><strong>Immigrants</strong></td>
<td>Five or more years documented status</td>
<td>Serves eligible regardless of immigrant status</td>
</tr>
<tr>
<td><strong>Nutrition Education</strong></td>
<td>SNAP-Ed Projects</td>
<td>Nutrition assessment and education part of each visit</td>
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</table>
Children on SNAP More Likely to be Healthier than Potentially Eligible Non SNAP participants

Source: Children’s HealthWatch. All reductions statistically significant at p<0.05
WIC

WIC Rx Nutrition Services

NAME ___________________________ DATE ___________________

Your doctor suggests that you consider visiting WIC for these services to help your family be healthy.

☐ Breastfeeding support
☐ Child’s healthy growth
☐ Assistance with family nutrition
☐ Nutritious foods
☐ Solutions for picky-eaters
☐ Prenatal nutrition
☐ Other: ___________________________

Call 1-800-942-4030 to make a WIC appointment.
Learn more at www.health.state.mn.us/wic

WIC Rx materials are funded by a grant from Hunger Free Minnesota.
USDA is an equal opportunity provider and employer. IC# 141-recc.05/2014
WIC Improves Child Health and Development

Adjusted for site, race/ethnicity, age, gender, birthweight, caregiver education, depression, & receipt of TANF.

Black et al. Archives of Pediatrics & Adolescent Medicine 2012;166(5)
### Prevalence of obesity* in WIC children ages 2-5, 2010. ¹,²

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<thead>
<tr>
<th></th>
<th>Minnesota (%)</th>
<th>United States (%)</th>
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<tbody>
<tr>
<td>White, Non-Hispanic</td>
<td>9.6</td>
<td>12.1</td>
</tr>
<tr>
<td>Black, Non-Hispanic</td>
<td>11.9</td>
<td>11.6</td>
</tr>
<tr>
<td>Hispanic</td>
<td>16.8</td>
<td>17.6</td>
</tr>
<tr>
<td>American Indian/Alaska</td>
<td>28.2</td>
<td>21.1</td>
</tr>
<tr>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>15.1</td>
<td>11.3</td>
</tr>
<tr>
<td>Total</td>
<td>12.7</td>
<td>14.4</td>
</tr>
</tbody>
</table>

* Obesity is defined as BMI-for-age percentile ≥95.
Figure 1. Obesity, Overweight in MN WIC Children ages 2-5 years\(^3\)

- Revised WIC Food Package

- Obesity
- Overweight
- Obese or Overweight

Yearly data points from 1990 to 2012 showing trends in obesity, overweight, and obese or overweight rates.
Figure 1. Preconception Obesity or Overweight Status in MN WIC Participants

Overweight/Obese (BMI $\geq 25$)
School, Summer, And Childcare Feeding Programs

- Get involved, support
- Debunk the blame
Community Programs

- Hunger Helpline
- Food shelves/Food kitchens
- Community gardens
- Hospital/clinic-based referrals and interventions
- No and low cost opportunities for physical activity
Political Engagement

• Federal assistance programs – support, expand, and improve
• Parallels to role physicians played with change in terms of tobacco industry – advertising, packaging, availability, product composition
Review

- Define the relationship between obesity and food insecurity in the US, and globally
- Describe potential explanatory etiologies for an obesity-food insecurity relationship
- Consider how this knowledge informs clinical care and guides interventions
Resources:

- Children’s HealthWatch -- http://www.childrenshealthwatch.org/
- MN Food Helpline - 1-888-711-1151
- Second Harvest Heartland -- http://www.2harvest.org/
- Hunger Free Minnesota -- http://hungerfreemn.org/
- Share Our Strength -- https://www.nokidhungry.org/
- Feeding America -- http://feedingamerica.org/
- FRAC (Food Research and Action Center) -- http://frac.org/
- FNS (Food & Nutrition Services)-USDA -- http://www.fns.usda.gov/
Questions?

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“Let food be thy medicine, thy medicine shall be thy food.”
- Hippocrates