Understanding the Connections: Food Insecurity and Obesity

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While all segments of the U.S. population are affected by obesity, food insecure and low-income people can be especially vulnerable due to the additional risk factors associated with inadequate resources and under-resourced communities. This brief first will highlight research on food insecurity and obesity, and then explore why food insecurity and obesity can co-exist.

What Does the Research Say About Food Insecurity and Obesity?

The extent of research on food insecurity and obesity has grown considerably since 1995, when a leading pediatrician published a medical case report that proposed a relationship between hunger and obesity.[1] At first, the relationship between food insecurity and obesity was considered counterintuitive and labeled a paradox. This was due, in part, to our limited understanding of the causes and consequences of food insecurity. But now, with a more extensive research base and comprehensive conceptual framework, researchers conclude that the "coexistence of food insecurity and obesity is expected given that both are consequences of economic and social disadvantage."[2]

While food insecurity and obesity can co-exist in the same individual, family, or community, the research on whether there is a statistically significant relationship provides mixed results.[3,4,5,6] A number of research studies in the U.S. and abroad have found positive associations between food insecurity and overweight or obesity. Other studies have found no relationship, or even a lower risk of overweight or obesity with food insecurity. Associations, or lack thereof, often differ by gender, age, and/or race-ethnicity. Making comparisons across studies is further complicated by differences in study design, measures of weight and food security status, and sample size and characteristics. Overall, based on several reviews of the literature, the strongest and most consistent evidence is for a higher risk of obesity among food insecure women.

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A selection of recent U.S. studies is provided below that demonstrate the mixed findings on the relationship between food insecurity and obesity. The majority of these studies control for socioeconomic factors (e.g., income, education) as well as demographic characteristics (e.g., age, gender, race-ethnicity).

Research Examining Food Insecurity and Obesity among Adults

- A study of more than 7,930 U.S. adults found that household food insecurity was associated with being overweight or obese among mothers, but not among fathers, child-free women, or child-free men.[7] (Researchers determined that this pattern among mothers was not attributable to pregnancy-related metabolic changes.)
- In a 12-state study of 66,553 adults, those who were food insecure had 32 percent greater odds of being obese compared with those who were food secure.[8] Obesity was significantly associated with food insecurity among the following five population sub-groups: women (but not men); those with some college education or who graduated from college; and those with no children or two children in the household.
- Food insecurity was associated with increased body mass index (BMI) among young women, but not young men, in a national study of more than 13,700 young adults 24 to 32 years of age.[9]
- Food insecurity was associated with a greater increase in BMI in a longitudinal study of more than 2,400 patients at a Massachusetts community health center.[10]
- Female baby boomers and older adults who were food insecure were 1.4 times more likely to have a higher BMI than those females who were food secure, based on a study set in an eight-county region of central Texas with 2,985 participants.[11] No association between food insecurity and BMI was observed among male participants.
- In a study of 810 pregnant women in North Carolina with incomes less than or equal to 400 percent of the income/poverty ratio, living in a food insecure household was associated with being severely obese before pregnancy and with experiencing greater weight gain during pregnancy.[12] Additional studies have found links between food insecurity during pregnancy and greater postpartum weight and BMI, particularly among women who were obese before or during pregnancy.[13,14]

Research Examining Food Insecurity and Obesity among Children and Adolescents

The following results for children and adolescents are less consistent than the studies for adults described above, which typically found a consistent relationship between obesity and food insecurity among adult women, but not men.

- Across five measures of obesity (i.e., BMI, waist circumference, triceps skinfold, trunk fat mass, and percentage of body fat), one study found no association between household food insecurity status and obesity among a national sample of 2,516 low-income children 8 to 17 years of age.[15]
- Young people 12 to 18 years of age from marginally food secure, low food secure, and very low food secure households were 1.4 to 1.5 times more likely to have central obesity than those from high food secure households, based on national survey data from 7,435 participants.[16] Those from low food secure and marginally food secure households also were significantly more likely to be overweight than their counterparts from high food secure households.
- A three-city study (Boston, San Antonio, and Chicago) of 1,011 low-income adolescents found that maternal stress in combination with adolescent food insecurity significantly increased an adolescent's probability of being overweight or obese.[17]
- According to a longitudinal study of more than 28,000 low-income children in the Massachusetts WIC program, persistent household food insecurity without hunger during infancy and early childhood was associated with 22 percent greater odds of child obesity at two to five years of age, in comparison to children from persistently food secure households.[18] These odds varied with the mother's pre-pregnancy weight status: children from households with persistent food insecurity without hunger were three times more likely to be obese if the mother was underweight and 34 percent more likely to be obese if the mother was overweight or obese, when compared to children from persistently food secure households; no association was found if the mother had a normal pre-pregnancy weight status.
- A smaller study of 222 young, predominantly Hispanic children whose caregivers were receiving WIC services found no association between overweight or obesity and household food security status.[19]

Why Can Food Insecurity and Obesity Co-Exist?

That food insecurity and obesity can co-exist and are significantly associated in some studies does not necessarily mean they are causally linked to each other. Both food insecurity and obesity can be independent consequences of low income and the resulting lack of access to enough nutritious food or stresses of poverty. More specifically, obesity among food insecure people – as well as among low-income people – occurs in part because they are subject to the same often challenging cultural changes as other Americans (e.g., more sedentary lifestyles, increased portion sizes), and also because they face unique challenges in adopting and maintaining healthful behaviors, as described below.

Limited Resources and Lack of Access to Healthy, Affordable Foods

- Low-income neighborhoods frequently lack full-service grocery stores and farmers' markets where residents can buy a variety of high-quality fruits, vegetables, whole grains, and low-fat dairy products.[20,21,22] Instead, residents – especially those without reliable transportation – may be limited to shopping at small neighborhood convenience and corner stores, where fresh produce and low-fat items are limited, if available at all. Comprehensive literature reviews examining neighborhood disparities in food access find that neighborhood residents with better access to supermarkets and limited access to convenience stores tend to have healthier diets and reduced risk for obesity.[23,24]
- According to USDA, "vehicle access is perhaps the most important determinant of whether or not a family can access affordable and nutritious food."[25] Households with fewer resources (e.g., SNAP households, WIC households, food insecure households) are considerably less likely to have and use their own vehicle for their regular food shopping than those households with more resources.[26] Food choices and purchases may be constrained by limits on how much can be carried when walking or using public transit (e.g., buying fewer items in bulk or that are heavy), or if consumers are limited to one large shopping trip a month with a friend or family member to buy the majority of their monthly food purchases (e.g., buying fewer perishable items like fresh produce).[27,28] Transportation costs also cut into the already limited resources of low-income households, and these costs plus travel time can be substantial.[29,30]
- When available, healthy food may be more expensive in terms of the monetary cost as well as (for perishable items) the potential for waste, whereas refined grains, added sugars, and fats are generally inexpensive, palatable, and readily available in low-income communities.[31,32,33,34] Households with limited resources to buy enough food often try to stretch their food budgets by purchasing cheap, energy-dense foods that are filling – that is, they try to maximize their calories per dollar in order to stave off hunger.[35,36,37] While less expensive, energy-dense foods typically have lower nutritional quality and, because of overconsumption of calories, have been linked to obesity.[38,39]
- When available, healthy food – especially fresh produce – is often of poorer quality in lower income neighborhoods, which diminishes the appeal of these items to buyers.[40,41]
- Low-income communities have greater availability of fast food restaurants, especially near schools.[42,43,44] These restaurants serve many energy-dense, nutrient-poor foods at relatively low prices. Fast food consumption is associated with a diet high in calories and low in nutrients, and frequent consumption may lead to weight gain.[45,46,47]

Cycles of Food Deprivation and Overeating

- Those who are eating less or skipping meals to stretch food budgets may overeat when food does become available, resulting in chronic ups and downs in food intake that can contribute to weight gain.[48,49,50] Cycles of food restriction or deprivation also can lead to disordered eating behaviors, an unhealthy preoccupation with food, and metabolic changes that promote fat storage – all the worse when combined with overeating.[51,52,53] Unfortunately, overconsumption is even easier given the availability of cheap, energy-dense foods in low-income communities.[54,55]

Food insecure and low-income people can be especially vulnerable to obesity because of the unique challenges they often face in adopting and maintaining healthful behaviors, including:

- Limited resources
- Lack of access to healthy, affordable foods
- Cycles of food deprivation and overeating
- High levels of stress, anxiety, and depression
- Fewer opportunities for physical activity
- Greater exposure to marketing of obesity-promoting products
- Limited access to health care

- The "feast or famine" situation is especially a problem for low-income parents, particularly mothers, who often restrict their food intake and sacrifice their own nutrition in order to protect their children from hunger.[56,57] Such a coping mechanism puts them at risk for obesity – and research shows that parental obesity, especially maternal obesity, is in turn a strong predictor of childhood obesity.[58,59,60]

High Levels of Stress, Anxiety, and Depression

- Members of low-income families, including children, may face high levels of stress and poor mental health (e.g., anxiety, depression) due to the financial and emotional pressures of food insecurity, low-wage work, lack of access to health care, inadequate transportation, poor housing, neighborhood violence, and other factors. For instance, a number of recent studies find associations between food insecurity and stress, depression, psychological distress, and other mental disorders.[61,62,63,64]
- Research has linked stress and poor mental health to obesity in children and adults, including (for adults) stress from job-related demands and difficulty paying bills.[65,66,67,68,69] In addition, a number of studies find associations between maternal stress or depression and child obesity.[70,71] Emerging evidence also suggests that maternal stress in combination with food insecurity may negatively impact child weight status.[72]
- Stress and poor mental health may lead to weight gain through stress-induced hormonal and metabolic changes as well as unhealthful eating behaviors and physical inactivity.[73,74,75,76] There also is growing evidence that low-income mothers struggling with depression or food insecurity utilize obesogenic child feeding practices and unfavorable parenting practices that could influence child weight status.[77,78,79,80]

Fewer Opportunities for Physical Activity

- Lower income neighborhoods have fewer physical activity resources than higher income neighborhoods, including fewer parks, green spaces, and recreational facilities, making it difficult to lead a physically active lifestyle.[81] Research shows that limited access to such resources is a risk factor for obesity.[82,83,84]
- There is emerging evidence that food insecurity is associated with less physical activity and greater perceived barriers to physical activity (e.g., too tired to be physically active).[85,86] In addition, many studies find that low-income populations engage in less physical activity and are less physically fit than their higher income peers.[87,88] This is not surprising, given that many environmental barriers to physical activity exist in low-income communities.
- When available, physical activity resources may not be attractive places to play or be physically active because low-income neighborhoods often have fewer natural features (e.g., trees), more visible signs of trash and disrepair, and more noise.[89,90]
- Crime, traffic, and unsafe playground equipment are common barriers to physical activity in low-income communities.[91,92] Because of these and other safety concerns, children and adults alike are more likely to stay indoors and engage in sedentary activities, such as watching television or playing video games. Not surprisingly, those living in unsafe neighborhoods are at greater risk for obesity.[93,94,95]
- Low-income children are less likely to participate in organized sports.[96,97] This is consistent with reports by low-income parents that expense and transportation problems are barriers to their children's participation in physical activities.[98,99]
- Students in low-income schools spend less time being active during physical education classes and are less likely to have recess, both of which are of particular concern given the already limited opportunities for physical activity in their communities.[100,101,102]

Greater Exposure to Marketing of Obesity-Promoting Products

- Low-income youth and adults are exposed to disproportionately more marketing and advertising for obesity-promoting products that encourage the consumption of unhealthful foods and discourage physical activity (e.g., fast food, sugary beverages, television shows, video games).[103,104] Such advertising has a particularly strong influence on the preferences, diets, and purchases of children, who are the targets of many marketing efforts.[105,106]

Limited Access to Health Care

- While the enactment of the Affordable Care Act of 2010 improved health insurance coverage rates in the nation, many low-income people still are uninsured and lack access to basic health care, especially in states that have not taken the Medicaid option.[107] This results in lack of screening for food insecurity and referrals for food assistance, as well as lack of diagnosis and treatment of emerging chronic health problems like obesity.

For more information on food insecurity and obesity, go to: www.frac.org. This brief was prepared by FRAC Senior Nutrition Policy and Research Analyst Heather Hartline-Grafton, DrPH, RD.

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