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# Food Insufficiency and Prevalence of Overweight Among Adult Women

P. Peter Basiotis, PhD  
Mark Lino, PhD

U.S. Department of Agriculture  
Center for Nutrition Policy and Promotion

A limited number of studies have shown that, in the United States, women in food insufficient households are more likely to be overweight than women in food sufficient households (Olson, 1999; Townsend, Peerson, Love, Achterberg, & Murphy, 2001). However, these studies utilized self-reported heights and weights to define overweight. To further examine this paradoxical association between food insufficiency and overweight, we used data from the 1988-94 National Health and Nutrition Examination Survey (NHANES III). In that survey, heights and weights were measured. To gain additional insight, we also examined women's overall diet quality as gauged by the Healthy Eating Index (HEI) and its components.

The 1988-94 NHANES contains information on people's (1) self-reported household food sufficiency status, (2) body mass index (BMI) based on measured height and weight, and (3) self-reported individual food intake for a 1-day period (which has been shown to be a reliable depiction of the usual diets of population groups). The survey is designed to be nationally representative, and we used weighted data to reflect the population of interest. We used this data set for analysis because it contains the most recent information on measured BMI, food intake, and food sufficiency status. In testing for statistical differences

between groups, we used the SUDAAN version 8 statistical software.

For analysis, women ages 19 to 55 who did not live alone were selected. This group was chosen because prior research has shown them to have higher rates of food insufficiency. Food sufficiency was measured by a woman reporting that her household had enough food to eat (food sufficient households); food insufficiency was measured by a woman reporting that her household sometimes or often did not have enough to eat (food insufficient households). The sample size was 4,804 women in food sufficient households and 437 women in food insufficient households.

## *Healthy Eating Index*

Diet quality of women was gauged by the HEI, which provides an overall picture of the type and quantity of foods people eat, their compliance with specific dietary recommendations, and variety in their diets. The Index consists of 10 components, each representing different aspects of a healthful diet.

Components 1-5 measure the degree to which a person's diet conforms to the USDA's Food Guide Pyramid serving recommendations for the five major food groups: Grains (bread, cereal, rice, and pasta); vegetables, fruits,

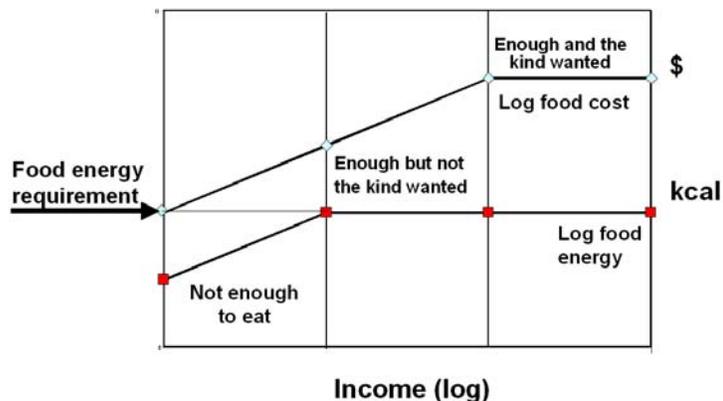
milk (milk, yogurt, and cheese), and meat (meat, poultry, fish, dry beans, eggs, and nuts). Component 6 measures total fat consumption as a percentage of total food energy (calorie) intake. Component 7 measures saturated fat consumption as a percentage of total food energy intake. Components 8 and 9 measure total cholesterol and total sodium intake, respectively. And component 10 measures the degree of variety in a person's diet.

Each component of the Index has a maximum score of 10 and a minimum score of 0. Intermediate scores are computed proportionately. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts. The maximum combined score for the 10 components is 100. An HEI score above 80 implies a "good diet," an HEI score between 51 and 80 implies a diet that "needs improvement," and an HEI score less than 51 implies a "poor diet" (Bowman, Lino, Gerrior, & Basiotis, 1998).

### ***A Greater Percentage of Women Reporting Food Insufficiency Were Overweight***

Looking at the BMI of women ages 19 to 55, we found a significantly higher percentage of those in food insufficient households were overweight (defined as having a BMI of 25 or more), compared with those in food sufficient households (58 vs. 47 percent). There were no significant differences between women in food sufficient and insufficient households in terms of mean BMI and percentage being obese (defined as having a BMI of 30 or more).

**Figure 1. The food insufficiency curve**



Source: Basiotis (1992).

Various possible reasons have been suggested for this paradox. First, an overweight woman may indeed view her household as being food insufficient because her view of the amount of food deemed necessary is too high. Second, a woman may engage in binge eating when food is available, thereby resulting in being overweight but not having enough food at hand during certain time periods. Third, a food insufficient woman may be consuming cheaper, less nutritious (more calorie-dense) food that leads to being overweight.

This last reason has received more attention recently. Basiotis (fig. 1) hypothesized and confirmed a behavioral mechanism by which household members faced with diminishing resources will first consume less expensive and more calorie-dense foods to maintain caloric intake at less cost. When resources diminish even further, household members reduce the amount of energy they consume to less than that needed. It is also known that in households with children, "maternal deprivation" is often observed where the mother will eat less food so that the children can eat more. To examine

the plausibility of this hypothesis in explaining the food insufficiency-overweight paradox, we looked at women's diet quality.

### ***Women Reporting Food Insufficiency Had a Worse Diet***

On average, caloric intake by women in food insufficient households was *statistically* similar to that of women in food sufficient households (1,959 kcal per day vs. 1,868 kcal per day). This, however, amounts to a difference in caloric intake of 4.6 percent which, if true, would be of *practical* significance and would help explain the paradox. Women from food insufficient households had a significantly worse diet quality than women in food sufficient households. The average HEI score was 58.8 for women in food insufficient households, compared with 62.7 for women in food sufficient households, a 6.2-percent difference. However, the average HEI score for both groups of women indicated that their diets needed improvement.

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There also were significant differences between women in food sufficient and insufficient households with regards to HEI component scores. Compared with women in food sufficient households, women in food insufficient households had significantly lower HEI component scores for vegetables (5.1 vs. 5.8), fruits (2.2 vs. 3.4), milk (5.2 vs. 6.1), cholesterol (7.4 vs. 8.2), and food variety (6.4 vs. 7.3). There were no statistically significant differences in the remaining HEI component scores between the two groups.

### ***The Paradox Remains***

Analysis of the NHANES III data reveals that women reporting to be in food insufficient households have a greater prevalence of being overweight and have a lower diet quality than do women in food sufficient households. While the association between food insufficiency and lower diet quality may be expected, that between food insufficiency and prevalence of being overweight seems to be a contradiction. How can a person report that in her household sometimes or often they do not have enough food to eat, yet be overweight? A definitive solution to this paradox must await additional research.

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