

The Links Between Food Insecurity, Food Program Participation, and Overweight Status in Children: Evidence from Early Childhood Longitudinal Survey

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Obesity is the most pressing nutritional problem in the United States. There is strong evidence of increased risk of poor health outcomes, such as cardiovascular disease, diabetes, and cancer, due to this condition. Moreover, close to two-thirds of the U.S. adult population is overweight or obese. The latest evidence also confirms dramatically increasing trends in the prevalence of overweight among children.

While there is little controversy about the proximal determinants of overweight status - that is, an imbalance between energy intake and expenditure - there is considerable complexity in the framework of distal factors that give rise to this imbalance. An emerging area of research is concerned with the relationship between household food insecurity and obesity. While it may seem like a paradox, several mechanisms could explain this relationship. Food insecurity could lead to an overweight status, if individuals overcompensate for periods when food is scarce, so that overall intake is greater. Weight cycling could also make the body more efficient in utilizing dietary energy, and thus over the long-run lead to an increased weight. Finally, energy-dense foods are often less expensive, so that food insecure households who can't afford to eat balanced meals or who must rely on a few kinds of low-cost foods, may have an overall greater energy intake.

Various studies have explored the food insecurity-weight status relationship empirically. There is apparent agreement of studies on adult women; most show a positive association between food insecurity and the probability of being overweight. However, no clear pattern has emerged when considering the food insecurity-overweight link in children. Some authors have suggested that the issue in children is unresolved, because of limitations, including sample size, of previous datasets. Thus our objective in this research project is to test the hypothesis that household food insecurity is positively associated with overweight status in children.

We carry this out with an analysis of data collected in the Department of Education's Early Childhood Longitudinal Survey-Kindergarten Cohort (ECLS-K). The ECLS-K is a large nationally representative survey of children, begun with the kindergarten class of 1998-99. The survey collected measured heights and weights on children twice per year in the kindergarten and first grade, the full 18-item USDA food insecurity module in the Spring of 1999, and a rich set of variables on the home and school environments of these children. We used the Centers for Disease Control and Prevention's algorithms for assigning BMI-for-age percentiles to each child's measurements. Children with a BMI that was greater than or equal to the 95th percentile of their sex-specific BMI-for-age chart were considered overweight. In addition to this indicator, we created a dichotomous variable indicating "risk of overweight," a CDC term for children with a BMI greater than or equal to the 85th percentile of their BMI-for-age chart. We used the standard dichotomous variable for food insecurity, which simply indicated whether the household was food insecure (i.e. either with or without hunger) or not.

Weight status is known to be affected by a number of biological and socio-economic factors. In order to control for potentially confounding variables we developed multi-variate logistic regression models in which the dependent variable was a dichotomous indicator of overweight status. Independent variables included our measure of household food insecurity and a full set of control variables, including: age, sex, and birthweight of the child; schooling of the mother; income, region, and urbanization of the household; as well as family meal patterns and child activity patterns. All analyses used ECLS-K weighting variables and accounted for the clustered nature of the sample, by using jackknife replicate methods to estimate standard errors.

Our main finding is that household food insecurity, when modeled with appropriate controls, is not associated with a higher prevalence of overweight among young school children and, if anything, seems inversely associated with weight status.

We believe our finding is relatively robust, since we found similar results a cross a range of different models. We tried dichotomous (food secure, insecure) and trichotomous (food secure, insecure without hunger, insecure with hunger) expressions of the food security variable and also used dichotomous and trichotomous expressions for child food insecurity. We also analyzed models with different expressions of the dependent variable, using "risk of overweight" as an indicator in one model, and simply body mass index, in continuous form, in another. We did a cross-section analysis based on data collected in the Spring of the child's kindergarten year. It should be noted that parents reported on household status in the

12 months previous to the interview, so a food insecure condition would have, in effect, preceded the child's weight status. Still, we tested whether food insecurity in the Spring of 1999 was predictive of overweight status a year later and found that it was not. We also tested whether household food insecurity in 1999 was predictive of a high weight gain over the next year and found an inverse association.

If for most young children, food insecurity is not associated with overweight status, our nation's most serious nutrition problem, does it mean that we should stop paying attention to food insecurity? Certainly not. In addition to concerns for equity of access to food, there are strong arguments for reducing food insecurity based on society's interest in improving the productivity of its next generation. A growing literature focused on children has found that food insecurity or hunger is associated with negative academic outcomes and poor psychosocial functioning at school, adverse health outcomes, and poor mental health.

It may mean, however, that food insecurity is less relevant for those whose main concern is to address the child obesity problem. For interventions that depend on low-cost social marketing techniques or for environmental change strategies that affect large groups of people, targeting of these program resources would be better accomplished with indicators other than food insecurity. For example we estimated that of all the overweight children in the ECLS-K sample 10 percent came from food insecure households, whereas 24 percent came from households in poverty. Thus targeting overweight prevention would be more appropriately focused on a general population of the poor than of the food insecure.