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# The Paradox of Hunger and Obesity

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### Introduction

The increasing prevalence of overweight and obesity over the last two decades or so is a global phenomenon, particularly in higher-income countries and in the cities of low- and middle-income countries (1,2). Although most evident in adults, overweight is also becoming more common in children than it was even a few years ago, producing a global worry on the part of public health professionals with regard to the predictable and already demonstrable increases in obesity-related diseases including Type II diabetes, high blood pressure, and heart disease. At the same time, food insecurity (lack of assured access through socially acceptable means by an individual or household to enough food for a healthy, active life) persists, and the prevalence in all societies responds to changing economic circumstances as the poorest households within a society exhibit food security only at the margin and are vulnerable to economic shocks.

The relatively recent demonstration, primarily but not exclusively in North American data, of positive associations between the risk of obesity and the risk of food insecurity for women (3, 4) has given rise to quite a controversy as to whether there may be causal relationships between the two phenomena. Clearly, an overweight person can experience food insecurity. Overweight and obesity take months and usually years to develop; food insecurity can occur acutely, intermittently, or cyclically at the household level and can be a very real experience without having enough impact on long-term energy balance to effect significant weight loss. There is no logical contradiction to the two problems co-existing in the same society; nevertheless, their co-existence raises questions that demand attention. For example, to what extent do food insecurity and obesity co-exist in given populations? What is the nature of the relationship between them? What is the relationship of each of them to underlying risk factors (e.g., poverty)?

### The Paradox Viewed from Different Perspectives

The *popular view* would hold that obesity results from overeating, and that undereating, produced by lack of access to food, must result in thinness. Therefore popular logic would conclude that if one sees a high prevalence of overweight and

obesity, one is looking at a population without a problem of food insecurity. This simplistic logic is important to articulate, because it also tends to characterize the perceptions of policy makers unless they are informed in more detail. From the point of view of the public health professional, the problem is quite different. Whether or not there are any causal links between the two phenomena, both obesity and food insecurity are complex and prevalent problems with serious consequences in many societies. The problem is how to provide safety nets and programs to prevent hunger and at the same time to mitigate the obesity epidemic, and to do both with limited resources.

### How do Food Insecurity and Obesity Relate to One Another?

Food insecurity is a consequence of poverty. Wherever obesity is common among poor individuals, the two conditions will co-exist in striking proportions. Data are emerging from many populations to document this phenomenon. For example, recent data from poor townships in Capetown, South Africa, reported more than 50% of adult women to be overweight or obese in a community in which 70% of households reported some degree of food insecurity over the previous month (5). Such reports from small surveys, however, are less convincing than nationally representative data, which also demonstrate the concept. In the US, more than one-third of adults are classified as overweight or obese (BMI >25 kg/m<sup>2</sup>) (6) and the prevalence of household food insecurity, measured by a standardized survey instrument, hovers at about 11% with about 4% of households reporting severe food insecurity resulting in hunger, or going without food for lack of resources (7).. In Iran, the 1999 National Health Survey reported that more than one-third of women and more than 25% of men over 40 years of age were overweight (8); at the same time – 1995 data national household food expenditure data showed that 20 percent of all households were food insecure, defined as purchasing less than 90% of their food energy needs and 11% were “severely food insecure” with household food purchases reflecting <80% of energy needs (9).

### How do undernutrition (underweight) and overweight relate to one another?

A related question is the extent to which underweight and overweight co-exist in the same societies and even in the same households. Increasingly, this double burden is being demonstrated in many countries. The obesity epidemic has arisen at a time when problems of undernutrition, particularly for children and women, have been inadequately solved. Almost every country, regardless of the proportion of adults who are overweight, still demonstrates some measurable proportion of chronic energy deficiency or thinness in adults; and even in those countries with high proportions of thin adults, some are overweight (10). China, home to the largest number of persons of any country in the world, demonstrates relatively low prevalences of each (around 10%) but approximately equal numbers of overweight and thin adults. Among children, we see similar pictures. The 1999 Iran National Health Survey demonstrated a prevalence of overweight among urban-dwelling 2-5 year old children of 11 and 9 percent in boys and girls respectively, and at the same time an underweight rate of 20 and 28% (8).

Most of the published evidence linking food insecurity and obesity has come from North American data. In several studies in the US, food insecurity and overweight or obesity in women have been positively correlated, while in the single nationally representative survey published from Canada, there was no relationship (3,4,11). The relationship for men has been nonexistent or inconsistent, as has been the situation for children. Several possible mechanisms for a positive relationship have been hypothesized, including behavioral (intermittent overeating), economic (relatively low cost of high-energy-density foods) (12, 13), metabolic (increased metabolic efficiency resulting from weight cycling), and ecological (association of both variables with poverty).

Recently, some investigators have been to examine the co-occurrence of obesity and underweight among members of the same households. An analysis of nationally representative data from three large low/middle-income countries, China, Russia and Brazil (14) is informative. Among household having an underweight member, the proportion also having an overweight member was high (23% in China, 44% in Brazil, and 58% in Russia). On the surface, this would lead one to believe there might be an association between the two conditions. However, the analysis shows that the probability of a household having both an underweight and an overweight member is a function of the prevalence of both conditions in the population and the average household size. The actual prevalence of households having both an overweight and an underweight member (11% in Brazil, 8% in China and 8% in Russia) is in all cases slightly lower than the prevalence that would be predicted if the two conditions were randomly distributed in the population (15.4%, 15% and 9.9% respectively). Thus in these three large populations, although the chances of an underweight individual having an overweight family member are high, the co-occurrence of the two conditions without households is actually slightly less than would be predicted if the risk of the two conditions were randomly distributed among households.

Food insecurity is directly and positively related to poverty. The relationships between obesity and poverty, in contrast, are indirect, complex and mediated by other variables. Obesity tends to be more prevalent in the higher socioeconomic strata of poor societies, and at least for women, in the lower socioeconomic strata of richer societies. The ways in which the nutrition transition is characterized not only by an increased prevalence of obesity but a shift in its socioeconomic distribution are largely a matter of speculation, but clearly the shift has occurred or is occurring in large middle-income countries. Poverty increases the risk of obesity in industrialized countries through several routes: A number of environmental factors associated with poverty result in decreased opportunities for physical activity – crowding, substandard housing, unsafe neighborhoods, poorer school infrastructures, few child care options, and lack of leisure time conspire to make healthy levels of physical activity difficult. Why might these factors affect urban women in particular? Lower income is associated in most societies with lower educational attainment for both men and women – for men, this may mean increased likelihood of employment in occupations requiring physical activity, while for women in many societies it results in greater likelihood of not working outside the home – which again may translate into lack of opportunity for regular physical activity.

The interpretation of the “paradox” of obesity and food insecurity is clear. Poverty is the major cause of food insecurity. In certain circumstances, primarily in urban environments, poverty also predisposes to obesity. Both can and do co-exist in communities and households, but the causal pathways are different. In terms of implications for action, there are two agendas to be address. Both food insecurity and obesity are consequential and preventable – the public health community needs to address both with appropriate policies and programs, and to do so simultaneously since often the same part of the population is at risk for both problems.

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