



Food deserts or food swamps?: A mixed-methods study of local food environments in a Mexican city



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ABSTRACT

Differential access to healthy foods has been hypothesized to contribute to disparities in eating behaviors and health outcomes. While food deserts have been researched extensively in developed Anglophone countries, evidence from low- and middle-income countries is still scarce. In Mexico, prevalence of obesity is among the highest worldwide. As obesity has increased nationally and become a widespread public health issue, it is becoming concentrated in the low-income population. This mixed-methods study uses a multidimensional approach to analyze food environments in a low-, middle-, and high-income community in a Mexican city. The study advances understanding of the role that food environments may play in shaping eating patterns by analyzing the density and proximity of food outlet types as well as the variety, quantity, quality, pricing, and promotion of different foods. These measures are combined with in-depth qualitative research with families in the communities, including photo elicitation, to assess perceptions of food access. The central aims of the research were to evaluate physical and economic access and exposure to healthy and unhealthy foods in communities of differing socioeconomic status as well as participants' subjective perceptions of such access and exposure. The findings suggest a need to reach beyond a narrow focus on food store types and the distance from residence to grocery stores when analyzing food access. Results show that excessive access and exposure to unhealthy foods and drinks, or "food swamps," may be a greater concern than food deserts for obesity-prevention policy in Mexico.

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1. Introduction

1.1. Nutrition transitions

Over the past two decades, overweight and obesity have emerged among the world's most important public health problems. In 2008, approximately 1.5 billion adults were overweight, of whom 500 million were obese (UN Food and Agriculture Organization, 2013). Overweight and obesity now are linked to more deaths worldwide than underweight and malnutrition (Ng et al., 2014).

In diverse countries over the past several decades, large shifts in dietary patterns have occurred. Modernizing societies are moving away from traditional diets and converging on diets that are high in fat, animal-source foods, sugars, and refined foods, and low in fiber.

Though this dietary pattern is often termed the "Western diet," it is a trend that is occurring worldwide (Popkin, 2002). Growing incomes in emerging market economies and the accelerated pace of global economic integration since the mid-1980s have spurred a faster convergence on this dietary pattern. Together, dietary changes and increasingly sedentary lifestyles are driving trends toward increased overweight and obesity and related degenerative diseases.

Mexico is a striking example of a country undergoing a rapid dietary transition. In 1988, less than one-third of all adults were overweight, and obesity-related diseases such as diabetes were rare; but by 2006, 71 percent of women and 66 percent of men were overweight or obese (Rivera et al., 2009). The remarkable rise of obesity in Mexico has gone hand-in-hand with a surge in diabetes. While stunting is still an important problem in young children in some poor communities, children, even in low-income rural areas, are more likely to be overweight than underweight (Barquera et al., 2013). In Mexico, the largest increases in overweight and obesity have been observed in adult women in the lowest living-

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conditions quintile—the rate of overweight and obesity grew by nearly 400% in the period 1988–2006 among adult women in the lowest quintile compared to an increase of 55% among those in the highest socioeconomic group (Rivera et al., 2009). As obesity has become a widespread public health issue in Mexico, it is becoming concentrated among lower socioeconomic groups.

1.2. Local food environments, socioeconomic status, and obesity

While overweight and obesity tend to be more prevalent in higher income groups in low-income countries, prevalence of excess body weight tends to become concentrated in low-income communities as countries develop economically (Jones-Smith et al., 2011). Thus, as countries become wealthier, the association between wealth and overweight tends to reverse, turning on its head the historical conception of obesity as a disease of affluence. The idea of “food deserts” began to be adopted as a possible explanation for the reversal of the economic gradient in obesity in advanced economies because they are environments that, paradoxically, may encourage excess caloric consumption (Wrigley et al., 2002). In the US, areas typically classified as food deserts are those with a high proportion of low-income residents who are constrained in their access to affordable, nutritious food because they live far from a large grocery store and do not have easy access to transportation (USDA, 2009). Common distance-to-supermarket guidelines are one mile for urban areas and ten miles for rural areas, where vehicle ownership is high (USDA, 2009). Underlying the argument that food deserts may explain the social gradient in obesity are three inter-related assumptions. The first is that economic insecurity may lead consumers to choose cheaper foods. The second is that (particularly in advanced economies) inexpensive foods often are calorically dense (Drewnowski, 2009; Drewnowski and Darmon, 2005). The third is that “healthy” foods may be less available or more expensive in low-income areas due to poorer access to supermarkets (Ellaway and Macintyre, 2000).

A number of studies conducted in the US have found an association between food availability and dietary patterns and/or obesity in disadvantaged urban areas. Many of these studies find that low-income communities have less access to supermarkets and suggest that lower supermarket access (because supermarkets are sources of affordable healthy foods such as fruits and vegetables) contributes to poorer dietary quality and higher obesity risk (Beaulac et al., 2009; Black and Macinko, 2008; Larson et al., 2009; Walker et al., 2010). However, more-recent research in the US does not find evidence that supermarket access contributes to healthier diets (An and Sturm, 2012; Boone-Heinonen et al., 2011) or healthier body mass indices (BMI) (Block et al., 2011; Lee, 2012). Overall, studies in the UK and Australia find less support for a correlation among socioeconomic status (SES), food deserts, and dietary patterns (Ball et al., 2009; Cummins et al., 2010; Pearce et al., 2008; Winkler et al., 2006; Wrigley et al., 2003).

There is ongoing debate in the public health community about how, precisely, to operationalize food deserts; the extent to which food deserts exist; and the mechanisms through which, where they do exist, they contribute to poor eating habits and excess body weight. One of the challenges in interpreting the varying findings from studies of food environments is the diverse methods used to assess food access. A rapidly growing number of studies use Geographic Information Systems (GIS) technology to analyze the density and location of different types of food stores and restaurants, and consumers' proximity to food outlets. While this research has provided a useful starting point for analyzing food access, it has used inconsistent classification systems to

categorize different food outlet types as proxies for healthy or unhealthy food access (Caspi et al., 2012). In addition, because a wide variety of unhealthy foods are marketed in large grocery stores, and many small neighborhood stores sell fruits and vegetables, research that relies only on store types to evaluate healthy food access may not accurately assess the quality of the food environment (Bodor et al., 2008).

Complicating matters further is the fact that individuals' interactions with their food environments are more complex than can be grasped by GIS analysis of residential neighborhoods alone. Studies that look beyond residential spaces to examine individuals' practices and exposures within their actual activity and mobility spaces may better capture food environment influences (Kwan, 2012; Rainham et al., 2010; Widener et al., 2013). Qualitative and mixed-methods studies find that work schedules, time constraints, prices, personal mobility, safety, product quality and variety, perceptions of customer service and other store characteristics, and familiarity and habit also influence whether consumers use neighborhood food outlets or more-distant stores (Bridle-Fitzpatrick, 2016a, 2016b; Cannuscio et al., 2014; Coveney and O'Dwyer, 2009; Krukowski et al., 2013; Kumar et al., 2010; LeDoux and Vojnovic, 2013; Walker et al., 2011; Whelan et al., 2002). Several studies have highlighted the value of investigating perceptions of food environments because how people perceive food access may influence dietary behaviors as much as objective measures (Caspi et al., 2012; Giskes et al., 2007; Gustafson et al., 2011; Moore et al., 2008; Sharkey et al., 2010; Williams et al., 2010).

While most recent studies of food deserts have focused on geospatial mapping of the food environment by analyzing the density, location, and proximity of store types, earlier research took a market-basket approach that examined within-store characteristics by analyzing the variety, quantity, quality, pricing, promotion, and placement of different foods (Beaulac et al., 2009). Few studies have taken a multidimensional approach, combining both geographic and within-store measures (Gustafson et al., 2013; Hermstad et al., 2010; Rose et al., 2010). Fewer still have combined multidimensional objective measures of food access with qualitative research that analyzes consumers' subjective perceptions of their food environments and interactions within them (Cannuscio et al., 2014).

Research on food deserts has thus far been almost entirely confined to developed Anglophone countries. Yet the rapid socioeconomic and nutrition transitions that are occurring in developing countries, together with an emerging concentration of obesity in low-income communities, call for multidimensional evaluation of food access in communities of different SES in emerging economies. Such research is an important step in developing appropriate strategies to minimize disparities in diets and health and to facilitate more healthful nutrition transitions.

This study uses a novel multidimensional approach to examine food environments in a low-, middle-, and high-income community in the Mazatlán, Sinaloa, Mexico metropolitan area. It combines both geographic and within-outlet measures of the local food environment with in-depth interviews, photo elicitation, and participant observation with families in the three communities to assess perceptions of food access. The central aims of the research were to investigate availability, access, and exposure to healthy and unhealthy foods in communities of differing SES in a Mexican city and to inquire in-depth about people's interactions with and perceptions of their food environments. Two groups of foods are of special interest: sugar-sweetened beverages (SSBs) and packaged snacks, and fresh fruits and vegetables. SSBs and packaged snacks are calorically dense and increasingly available foods that contribute to rising prevalence of obesity in Mexico and other

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