

Predictors and Outcomes of Household Food Insecurity Among Inner City Families with Preschool Children in Vancouver

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ABSTRACT

Objectives: The purposes of this study were to measure household food security and to determine its association with potential predictor variables related to household and community environments, as well as the relationship between household food insecurity and preschool children's nutritional status.

Methods: In this cross-sectional study, household food security was measured in a convenience sample of households (n=142) with children aged 2-5 years in Vancouver in March 2004. We assessed the association between environmental predictors and household food security status, adjusted for household income. Indicators of children's nutrition were compared between categories of household food security.

Results: Household food insecurity was associated with indicators of suboptimal health status in preschoolers. After controlling for household income, parents with less access to food of reasonable quality, fewer kitchen appliances and a lower rating of their cooking skills had greater odds of experiencing household food insecurity.

Implications: Our study results support the need to test interventions involving collaborative efforts among government, social planners and public health practitioners to remove barriers to food security for families. Multiple measures, including opportunities to gain practical food skills and household resources that enable convenient preparation of nutrient-dense foods, could be examined. Our findings suggest the need for improved selection and quality at existing small stores and an increase in the number of food outlets in low-income neighbourhoods.

MeSH terms: Hunger; nutritional status; child, preschool

La traduction du résumé se trouve à la fin de l'article.

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Acknowledgements: M. Broughton was supported both with a student research grant from the Human Early Learning Partnership, and as a graduate trainee in the Partnering in Community Health Research Program, funded by the CIHR Strategic Training Program Grant and the Michael Smith Foundation for Health Research.

Substantial evidence suggests that the first few years of life are a key time for child development. Children who cannot participate in learning experiences during this period may not realize their full potential.^{1,2} Evidence indicates food insecurity has adverse consequences on children's ability to participate in learning experiences due to difficulty concentrating, poorer health status, more disruptive behaviour and aggression.^{3,4} Food insecurity for individuals and households includes a continuum, typically progressing from uncertainty or anxiety about a household's food supply, to reduced quality and then quantity of food consumed by adults and then children.⁵

This study aimed to describe the relationship between household food insecurity and measured biological indicators of children's nutritional status. The second objective was to describe environmental and contextual factors correlated with household food insecurity that may be influenced through public health and social policy or programs.

METHODS

Household food insecurity was measured using the 18-item United States Department of Agriculture's Food Security Survey Module.⁶ In this survey, household food insecurity is defined as anxiety about a household's food supply or reduced quality or quantity of food consumed.

We conducted this survey in several low-income neighbourhoods in Vancouver. We identified a convenience sample and interviewed parents in English, Cantonese or Mandarin. This study assessed food security as both a predictor of children's nutritional health and an outcome of proximal risk factors according to a theoretical framework developed by Campbell (Figure 1).⁷

Proximal covariates of household food security were chosen based on a social ecological framework and were related to the physical environment, the social environment or personal/household resources.⁸

For each child, blood hematology, serum ferritin and zinc levels were obtained, height and weight were measured and body mass index values were categorized according to the U.S. Centers for Disease Control guidelines.⁹

Analyses examined the association of children's measured body mass index with

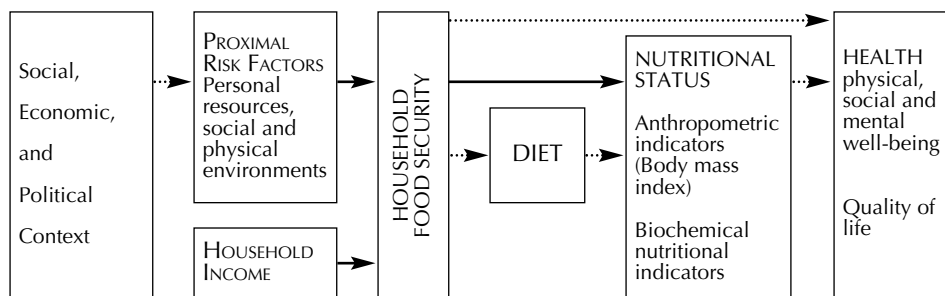


Figure 1. Conceptual framework of food insecurity, its risk factors and consequences
Adapted from Campbell, 1991⁷

household food security. They also compared children's serum ferritin and zinc levels between households that reported food insecurity versus those that did not. Finally, we assessed the association between environmental predictors – such as the number of kitchen appliances, self-rated cooking skill and access to quality food and household food security status – adjusted for household income.

Informed written consent was obtained for all participants. Ethics approval for the study was granted by the University of British Columbia Clinical Research Ethics Review Board.

RESULTS

The study sample included 142 households in Vancouver, each with a child between the ages of 2 and 5.

The prevalence of food insecurity, anxiety about a household's food supply, or reduced quality or quantity of food consumed, was five times higher in the study sample compared to the Vancouver population (50% vs. 10.4%).¹⁰ Low income was the primary risk factor for food insecurity, yet our results indicate that factors apart from household income, in household and community environments, were potential barriers to food security.

Median serum zinc levels were significantly lower among children from food-insecure households, pointing to poorer quality diets compared to those living in food-secure situations. However, in both groups, median serum zinc levels fell between the 25th and 50th percentile values of American children in the 1980s, suggesting suboptimal intakes in children in both groups. Few children (less than 7%) in either the food-secure or food-insecure groups had indications of iron depletion.

One third of the children sampled were overweight or obese and preschoolers in food-insecure households had over twice the odds of a body mass index indicating overweight/obesity compared to those in food-secure households. One of the most common concerns of food-insecure parents was their reliance on a few kinds of low-cost foods for children.

Households with less-equipped kitchen facilities and parents with less personal capacity in terms of self-rated cooking skill had 3 times (confidence interval (CI) 1.1, 11.1) and 8 times (CI 1.4, 41.8), respectively, the odds of food insecurity compared to households with the greatest resources after adjusting for differences in household income. Households with the least access to food of reasonable quality had 10 times the odds (CI 1.1, 90.0) of reporting food insecurity relative to those reporting the greatest access to quality food.

DISCUSSION

In a convenience sample from Vancouver, we found that inner city households with children experience food insecurity at dramatically higher rates than the city overall.

Food insecurity and children's nutritional health

In industrialized countries, malnutrition includes both over- and under-nutrition; individuals can be overweight and at the same time undernourished in terms of micronutrients. This paradox was reflected in our results. Zinc is widespread in the food supply but primary sources for Canadian preschoolers are meat and milk, with smaller amounts from grain products.¹¹ Thus, the adequacy of intakes of meat, meat alternatives and dairy products is questionable. Iron is found in meat

and alternatives as well, however iron depletion was less prevalent than zinc depletion in both food-secure and food-insecure groups. Public health policy on the fortification of inexpensive grain products, such as breakfast cereals, with high levels of iron may have been effective in increasing intake of iron and reducing iron deficiency among all children.

Since about half of children from food-insecure settings were already involved in supplementary food programs, results of this study indicate these programs may be insufficient to mitigate the chronic dietary compromises related to household food insecurity. Public health can advocate for sufficient funding and for provision of high-quality, nutrient-dense foods to children in order to optimize the effects of these programs.

Increasing evidence indicates that energy-dense diets, high in fat, sugar and starch, tend to be lower in micronutrients and of lower cost compared to nutrient-dense diets.¹² Further research is needed to assess the effect of household food insecurity on children's dietary nutrient density and the cost of a nutritious diet for children.

Environmental correlates of food insecurity

Our results suggest cooking skills and appliances play a role in providing choice and control over food, as food-insecure parents juggle taste, nutrition, cost and convenience in their food selections. In such information resources as Canada's Food Guide to Healthy Eating, governments and health agencies promote consumption of unprocessed foods; however, there are few public health programs aimed at increasing parents' ability to obtain and prepare healthy meals. For parents living under the constraints of food insecurity and lacking personal/household resources, the marketplace promotes many food products that are convenient to prepare and palatable to children. They coincidentally cost less but are less nutritious compared to a diet made from whole foods.¹³

In low-income urban neighbourhoods, typically there are few full-service grocery stores. Convenience stores and small markets, offering foods of lower quality with less nutritional value, are commonly the only options for mothers with small children without access to a vehicle.^{14,15} Our

study results suggest the need to test interventions involving collaborative efforts among municipal government, social policy-makers and public health practitioners to remove barriers to healthy eating for families. Health authorities could work with city planners to develop and evaluate policies that encourage the situating of farmer's markets and grocery stores in inner city areas. To provide a better understanding of barriers to food access and to support efforts toward municipal policy change, public health personnel could assess food selection, quality and prices at existing stores in low-income neighbourhoods and map household food security by postal code in relation to geographic location of various types of food outlets.¹⁶

Our study provides results from an unrepresentative convenience sample in an urban inner city area. If confirmed by future studies, these findings may inform further interventions to improve household food security and children's nutritional health.

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RÉSUMÉ

Objectifs : Le but de cette étude était de mesurer la sécurité alimentaire des ménages et de déterminer comment interviennent les prédicteurs environnementaux potentiels concernant les ménages et la collectivité, en plus d'examiner le rapport entre l'insécurité alimentaire du foyer et l'état nutritionnel des enfants d'âge préscolaire.

Méthodologie : Dans cette étude transversale, la sécurité alimentaire a été mesurée dans un échantillon de commodité de ménages (n=142) comptant des enfants de 2 à 5 ans à Vancouver en mars 2004. Nous avons évalué le rapport entre les prédicteurs environnementaux et la sécurité alimentaire des ménages, avec un ajustement selon le revenu familial. Les indicateurs de nutrition des enfants ont été comparés en fonction de différentes catégories de sécurité alimentaire des ménages.

Conclusions : L'insécurité alimentaire des ménages est associée à des indicateurs d'état de santé sous-optimal chez les enfants d'âge préscolaire. Compte tenu du revenu des ménages, on a constaté que les parents ayant plus difficilement accès à des aliments de qualité raisonnable, moins d'appareils de cuisine et moins de connaissances au point de vue culinaire étaient plus susceptibles de vivre dans l'insécurité alimentaire.

Importance : Notre étude démontre qu'il est nécessaire de mettre à l'essai des interventions assurées en collaboration par les gouvernements et les intervenants en planification sociale et en santé publique afin de faire tomber les barrières faisant obstacle à la sécurité alimentaire des familles. On pourrait examiner différentes mesures, comme permettre aux familles d'acquérir des compétences pratiques en alimentation et leur offrir des ressources leur permettant de préparer des aliments nutritifs. Nos constatations supposent qu'il est nécessaire d'améliorer le choix et la qualité des aliments dans les petits marchés d'alimentation existants et d'augmenter le nombre de marchés d'alimentation dans les quartiers à faible revenu.