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In this Issue

What have we learned from two decades of research on household food security?

Research using experiential measures of household-level food security is now well into its second decade. The current trajectory began with studies by private and academic researchers and accelerated following the development of the Household Food Security Survey Module (HFSSM) by the US Department of Agriculture, the US National Center for Health Statistics and collaborators from universities and the private sector[1,2]. Based on the HFSSM and methodologically related measures, scores of peer-reviewed articles and reports have been published about the measurement of food security and the causes and consequences of food insecurity. This issue of *Public Health Nutrition* adds to that literature the largest number of articles on the topic to appear in the same issue of any peer-reviewed journal to date. Considering this level of research activity, it is interesting to reflect on what we have learned about food security in the last two decades. Here are three salient insights we have gained.

Quality of measurement matters

The care taken to develop a measure based on sound theory, qualitative research into how low-income people describe their food situations and statistical methods borrowed from psychometric and educational testing fields has paid off. The resulting approach to measuring food security has stood the test of time and has been found to translate well across cultural and linguistic divides, particularly when focus groups or cognitive interviews have been employed to ensure high-quality translation. Articles in this issue include measures implemented in Honduras[3], Brazil[4], Australia[5], Canadian First Nations[6], the Canadian general population[7,8], US American Indians[9] and the US general population[10–12]. Psychometric assessments based on the statistical principles underlying the food security measure have been conducted in a wide range of cultural and linguistic settings, sometimes resulting in minor reformulation of questions, but generally finding good evidence of validity and reliability of the measures in national surveys[13–15] and in pilot surveys in many other countries.

Work remains to resolve important measurement issues, however. In this issue, Matheson and McIntyre find that married men and married women in similar circumstances respond differently to the food security questions[7]. Elsewhere, Nord and Hanson[16] found that adolescents' self-reported food security differed considerably from their parents' proxy reports, and qualitative studies by Fram and colleagues shed light on reasons for these differences[17,18]. On another front, modifications may be needed in populations with unusual food environments. Skinner *et al.* note that measurement would be improved among First Nations respondents by taking into account non-market food procurement, such as hunting and fishing, and the limited and erratic availability of store-bought food in the community because of remoteness and unreliable transport[6]. Such modifications may also be important in populations reliant on subsistence agriculture, for whom adequate food availability may depend more on their own production for home use than on financial capacity to procure food.

Outcomes of food insecurity are not good

Inclusion of food security measures in health and education surveys has provided data for analyzing associations with health and child development conditions that are hypothesized to be outcomes of food insecurity. Outcomes for children have been studied extensively, as summarized by Coleman-Jensen *et al.*[19]. The list of outcomes associated with food insecurity is too long to even summarize here, but none of the outcomes is good. Fewer studies have examined outcomes for adults, but several problematic outcomes have been identified, as summarized by Matheson and McIntyre[7] and by McIntyre *et al.*[8]. Food insecurity can rightly be considered a public health concern. De Cássia Ribeiro-Silva *et al.* extend this line of research to Brazil, examining food insecurity as a possible risk factor for asthma[4].

Almost all of the outcomes research has been based on cross-sectional studies, so causality is difficult to attribute and mediating mechanisms are not well understood. For child outcomes, much of the research suggests that mediating mechanisms such as parental stress, parenting practices and psychological stress on children may be as important, or more important, than disruption of children's nutrition. Furthermore, it seems likely that food insecurity is usually accompanied by other material hardships that are not measured in most studies and that the associations of problematic outcomes with food insecurity may reflect, in part, effects of those other hardships. In this case, measured food insecurity may function as a marker of health and development risk rather than as a risk factor. Depending on the specific programmatic interventions contemplated, understanding the exact causal path may not matter.

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Nevertheless, improved understanding of the casual relationships may improve programmatic design and is a worthwhile objective for further research.

As food security measurement has extended into middle-income and low-income countries, associations of food insecurity with anthropometric measures of chronic undernutrition such as stunting and wasting have been of interest. Ben-Davies *et al.* examine this association (among others) in a low-income area of Honduras[3]. In-sample medians of stunting, wasting and weight-for-age of children aged 6–18 months were all worse in food-insecure households than in food-secure households, and worse in severely food-insecure than in moderately food-insecure households. The associations were relatively weak, however, and not statistically significant. In an unpublished analysis from a very-low-income area in Guatemala, I found similarly weak but statistically significant cross-household relationships. What is striking, however, are the associations across the studied sub-populations. In the Ben-Davies *et al.* sample, 37 % of households with young children had severe food insecurity, and national surveys showed 25 % stunting and 20 % wasting for children under 5 years old in that area. In my unpublished Guatemala analysis, both very low food security among children and stunting of children younger than 5 years were near 50 %. In contrast, in the USA and Canada, where severe child undernutrition is too rare to be monitored, severe child food insecurity is less than 1 %[13–19].

As more survey data become available from low-income countries, such cross-country comparisons will be a worthwhile area for further study. The FAO is currently contracting with the Gallup organization to include an experiential food security module in the Gallup World Poll, an internationally comparable livelihood survey conducted annually in more than 150 countries. If this 'Voices of the Hungry' project is successful, new data will become publicly available to explore the associations between food insecurity and national-level measures of undernutrition across a wide range of low-income countries[20].

Income is a key determinant of food security, but many other factors also matter. Experiential food insecurity is conceptualized and measured as resulting from economic limitations. In most food security survey modules, each question specifies a lack of resources as the reason for the behaviour or condition ('We couldn't afford…' or '…because there wasn't enough money for food'). Not surprisingly, then, in almost all studies, income is found to be a primary determinant of food insecurity. Indeed, any study of causes or consequences of food insecurity that does not control for income is likely to be challenged in peer review.

Although this relationship holds on average, the correlation is generally not very strong across households. This is in part due to inadequate measures of income, but also due to other factors that impact food security. In this issue, Beatty *et al.* find that time constraints limit food security for some households[10]. Other factors such as low education[3,8,9], violence and histories of violence[11], holding multiple jobs and visible minority status[8], low food knowledge and low healthy-eating self-efficacy[9], being separated, divorced or widowed and not being employed[5] are also found to be associated with food insecurity. In the USA, cross-state analyses have found that factors such as cost of housing, state median wages and state average tax burden on low-income households are also associated with food insecurity in analyses that include a rich set of controls for potentially confounding conditions[21].

More recently, Coleman-Jensen and Nord found disabilities among adults to be strongly associated with food insecurity[22]. Of all households with very low food security in the USA that included working-age adults, 38 % included a working-age adult with a disability. In part, this appeared to result from higher household expenses; nearly twice as much income was needed to maintain food security in households with an adult with a disability as in otherwise similar households with no adult with a disability. On the other hand, households with elderly are generally more food secure than other households with the same per-person income[23].

The way forward

In summary, understanding and awareness of food insecurity have come a long way in the last two decades thanks to development of a credible measure of this important but previously unmeasured condition. The articles in this issue move the field forward another step. Yet, much remains to be done. Much is known that has not yet been incorporated into policy and programme design. Understanding of some key relationships and the underlying processes and mechanisms that mediate them is still preliminary and partial. Data from several countries that now regularly monitor food security in nationally representative surveys are available to address these questions. Extension of the methodology to low-income countries will create new opportunities for research – research that can inform policies and programmes affecting populations with more severe and widespread food insecurity than that of most populations studied in these first two decades.

Disclaimer

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