The household food insecurity access scale and an index-member dietary diversity score contribute valid and complementary information on household food insecurity in an urban West-African setting.

Becquey E, Martin-Prevel Y, Traissac P, Dembélé B, Bambara A and Delpeuch F; J Nutr 140: 2233-2240, 2010.

Introduction

According to the United Nations' Food and Agriculture Organization, food security exists when, "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs and food preferences for an active and healthy life" (FAO, 2003). Although there seems to be general agreement regarding the concept of food security, measuring the prevalence of food insecurity remains challenging. Moreover, there have been few attempts to validate currently available food security assessment instruments. These issues are important for Africa, including both rural and urban areas, because the high prevalence of poverty and periodic food shortages place many African populations at risk of food insecurity. To target high risk populations and evaluate the effectiveness of interventions, it is important to be able to identify food insecure households and measure changes in food insecurity over time.

Several data collection instruments have been used to measure different aspects, determinants or outcomes of food (in)security in various contexts. Among them, the Household Food Insecurity Access Scale (HFIAS, a standard 9-item questionnaire about frequency of food insecurity experiences) and the Dietary Diversity Score (DDS, which provides information on the number of different food groups consumed over the previous 24 h) are two promising methods for assessing household food insecurity. This review reports on the results of an external validation of HFIAS and a DDS conducted for an index-member of the household (IDDS) to inform on food insecurity and diet quality of urban households in Burkina Faso.

Methods

The study was based on a longitudinal observational survey of a representative sample of 1,056 households in Ouagadougou, the capital of Burkina Faso. Two rounds of data collection were completed in 2007, using a cluster sampling design. The first round was completed at the beginning of the rainy season (May-August) and the second at the start of the dry season (October-December). During each round, two quantitative 24-hour dietary recalls were performed at the household level on non-consecutive days. At the same time, data were collected for the HFIAS and IDDS. The HFIAS quantifies households with regard to their food security, using a scale ranging from 0 (food secure) to 27 (severely food insecure), and the IDDS provides information of the diversity of food intake by one selected household member (the "index" person), with scores ranging from 0 (no food intake) to 14 (maximum diversity). Based on the dietary recall data, an energy adequacy ratio was calculated as the ratio of household daily energy intake in relation to the household daily energy requirement, with a maximum value of 1. Similarly, 11 micronutrient adequacy ratios were calculated for vitamin A, thiamin, riboflavin, niacin, vitamin B_6, folate, vitamin B_{12}, vitamin C, calcium, iron and zinc. The mean of the 12 ratios, defined as the Mean Adequacy Ratio (MAR), was used as the reference for assessing household food

insecurity and household diet quality. The relationships between HFIAS, IDDS and the MAR were analyzed through structural equation modeling to take into account the effects of measurement error inherent to dietary data. Receiver-Operation Characteristics (ROC) analysis was also used to assess the ability of the HFIAS and IDDS to identify individual high risk households.

Results and conclusions

According to the dietary recall histories, household food consumption covered 77% of the households' energy needs and 20-72% of the households' micronutrients needs. The mean usual MAR was 0.52 ± 0.01, and the diets were particularly deficient in vitamin B_{12}, calcium, riboflavin, iron, folate and niacin (adequacy ratios<0.50). The median HFIAS score was 4 (inter-quartile range: 0-11) for the first round and 5 (inter-quartile range: 0-12) for the second round. The respective mean IDDS were 5.63 ± 0.12 food groups in the rainy season and 5.28 ± 0.10 food groups in the dry season.

The path coefficient (P) between the MAR and HFIAS was negative and significant ($P = -7.95 \times 10^{-3} \pm 1.45 \times 10^{-3}$, $P < 0.001$; standardized P = 0.45), whereas the coefficient between IDDS and the MAR was positive and significant ($P = 5.19 \times 10^{-2} \pm 1.27 \times 10^{-2}$, $P < 0.001$; standardized P = 0.41). This suggests that HFIAS and IDDS are good indicators of household food insecurity and household diet quality, although with opposite interpretations: a higher HFIAS indicates less adequate food security, whereas a higher IDDS indicates greater dietary diversity. Considering three high cut-offs and three low cut-offs of the MAR, for both rounds of the survey and both indicators, all but two areas under the ROC curve were significantly different from the reference curve, indicating that the prediction was greater than expected by chance alone. However, none of the areas exceeded 0.70, which was the pre-established cutoff of adequate predictive power for identifying individual high risk households. This means that HFIAS and IDDS could be used to assess seasonal or geographic trends in food security in groups of households, but should not be used to determine whether individual households are food secure or insecure.

Program and Policy Implications

Advantages of the HFIAS and IDDS assessment instruments are that the data collection methods are relatively simple and inexpensive, and derivation of the operational indicators requires only basic technical skills. Moreover, the questionnaires are well accepted by respondents. In addition to their operational properties, both HFIAS and IDDS contribute valuable information on food insecurity and diet quality for evaluation and monitoring purposes, and they have been applied successfully in a West-African urban context. Both indicators complement each other by capturing different dimensions of food insecurity and providing a more complete overview of the situation than is possible by using either indicator alone. On the other hand, the indicators cannot yet be recommended for targeting individual urban households, and their potential for early warning still needs to be evaluated.

NNA Editors' comments*

This paper is one of a series of recent studies of dietary intake in Burkina Faso. In addition to the specific results concerning food security assessment methods presented in this month's NNA, the whole set of studies is noteworthy because there is surprisingly little *quantitative information* on food and nutrient intakes by *representative samples* of different African populations. Thus, the descriptive information provided by these studies is useful for understanding the prevalence and risk factors of inadequate intake, the relationships between dietary intake and selected health outcomes, and possible

strategies for improving the diet and formulating related food production and importation policies in this setting. Previous studies of different Burkinabe population groups conducted by the same investigators indicated that: 1) the diets of urban women in Burkina Faso had low micronutrient adequacy, except for those women who consumed more animal source foods (Becquey, 2010a); and 2) specific dietary patterns, especially "modern snacking patterns," were more likely to be associated with overweight (Becquey, 2010b). Finally, the dietary data have also been used as part of a larger study to assess whether a simple food group diversity score could predict dietary adequacy (Arimond, 2010). This interesting set of studies should motivate other investigators to collect quantitative information on dietary intakes by well defined populations in other parts of Africa, and to use available data collection instruments to assess food security.

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* Note that the Editors' comments and discussion of program and policy implications have been added by the editorial team and are not part of the cited publication.

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Christian Fares
Managing Editor, Nutrition News for Africa
Helen Keller International (HKI)
cfares@hki.org