Food Insecurity among Volunteer AIDS Caregivers in Addis Ababa, Ethiopia Was Highly Prevalent but Buffered from the 2008 Food Crisis\textsuperscript{1,2}

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Abstract

Our objective in this study was to assess the validity and dependability of the Household Food Insecurity Access Scale (HFIAS), which was developed for international use, among community health volunteers in Addis Ababa, Ethiopia. The HFIAS was translated into Amharic and subsequently tested for content and face validity. This was followed by a quantitative validation study based on a representative sample (n = 99) of female community volunteers (HIV/AIDS home-based caregivers), with whom the HFIAS was administered at 3 time points over the course of 2008, in the context of the local and global “food crisis.” By pooling observations across data collection rounds and accounting for intra-individual correlation in repeated measures, we found that the HFIAS performed well according to standards in the field. We also observed slight amelioration in reported food insecurity (FI) status over time, which seems paradoxical given the increasing inaccessibility of food over the same time period due to inflating prices and disappearing food aid. We attempted to resolve this paradox by appealing to self-report–related phenomena that arise in the context of longitudinal study designs: 1) observation bias, in which respondents change their reports according to changing expectations of the observer-respondent relationship or change their behavior in ways that ameliorate FI after baseline self-reports; and 2) “response shift,” in which respondents change their reports according to reassessment of internal standards of FI. Our results are important for the validation of FI tools and for the sustainability of community health programs reliant on volunteerism in sub-Saharan Africa. J. Nutr. 139: 1758–1764, 2009.

Introduction

Household food security is defined by the FAO of the United Nations as access to a diet of sufficient quantity and quality for all household members at all times, through socially acceptable ways, to maximize the likelihood of healthy and active living (1). As defined by USAID, food security has 3 components: availability, access, and utilization (2). In the past 2 decades, researchers have sought to develop tools for measuring food insecurity (FI)\textsuperscript{7} that directly assess the experience of the phenomenon at the household level; although a standard FI module has been available for use in the US for several years (3), a standard FI scale proposed for international use was published only as recently as 2006 (4). The Household Food Insecurity Access Scale (HFIAS) was deemed by its developers to capture the “universal experience of the access component of household food insecurity across countries and cultures,” (4) and to require only minor adaptation to local contexts.

According to Frongillo (5), dependability in a FI measure, or the extent to which differences in the measure consistently reflect differences in the phenomenon, “might be [an issue] for short time spans if, for example, transient events in people’s lives influence assessment of their food security status.” In other words, when the ecology of household food access is changing, we would expect a sensitive FI scale to reflect these changes. Thus, the objectives of this paper were to briefly describe the process of adaptation and validation of an Amharic language version of the HFIAS and to present evidence that the HFIAS performed well according to standards in the field. We also observed slight amelioration in reported food insecurity (FI) status over time, which seems paradoxical given the increasing inaccessibility of food over the same time period due to inflating prices and disappearing food aid. We attempted to resolve this paradox by appealing to self-report–related phenomena that arise in the context of longitudinal study designs: 1) observation bias, in which respondents change their reports according to changing expectations of the observer-respondent relationship or change their behavior in ways that ameliorate FI after baseline self-reports; and 2) “response shift,” in which respondents change their reports according to reassessment of internal standards of FI. Our results are important for the validation of FI tools and for the sustainability of community health programs reliant on volunteerism in sub-Saharan Africa. J. Nutr. 139: 1758–1764, 2009.

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\textsuperscript{4} Abbreviations used: ALERT, All-Africa Leprosy and Tuberculosis Research and Training Hospital; FI, food insecurity; GEE, generalized estimating equation; HFIAS, Household Food Insecurity Access Scale; NGO, nongovernmental organization; USD, United States dollar.

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Ethical treatment of participants. The study protocol was approved by the Ethics Committees of the Addis Ababa University Faculty of Medicine and the Armauer Hansen Research Institute/All-Africa Leprosy and Tuberculosis Research and Training Hospital (ALERT) Hospital (Addis Ababa) and by the Institutional Review Board of Emory University.

Setting. The precise setting for this study included the neighborhoods surrounding the Ethiopian Ministry of Health’s ALERT Hospital on the southwest outskirts of Addis Ababa. ALERT Hospital’s HIV/AIDS Department clinic attempts to provide universal treatment access to 2 of Addis Ababa’s 10 subcities. Addis Ababa is the capital city of Ethiopia, with an estimated population of over 3 million inhabitants. In the face of a late-maturing HIV/AIDS epidemic (7,8) and woefully distributed public health services, volunteerism in community health care has grown substantially over the past decade in Addis Ababa. In the poorest and most crowded neighborhoods of this capital city, hundreds of underemployed adults volunteer with social welfare programs to provide home-based care for people living with AIDS. Most home-based care volunteers come from poor backgrounds in Addis Ababa, a city with high unemployment (9), a high prevalence of FI (10,11), and high food price inflation over the course of 2007–2008 (12,13).

Instrument adaptation and qualitative validation. We based our adaptation of the HFIAS on the premise that the content of the English language tool was developed for international use (4,14). The HFIAS includes the following 9 items, all of which are asked with a recall period of 30 d: 1) Did you worry that your household would not have enough food? 2) Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources? 3) Did you or any household member eat just a few kinds of food day after day because of a lack of resources? 4) Did you or any household member eat food that you did not want to eat because of a lack of resources to obtain other types of food? 5) Did you or any household member eat a smaller meal than you felt you needed because there was not enough food? 6) Did you or any household member eat fewer meals in a day because there was not enough food? 7) Was there ever no food at all in your household because there were no resources to get more? 8) Did you or any household member go to sleep at night hungry because there was not enough food? 9) Did you or any household member go a whole day without eating anything because there was not enough food? The 9 items were translated into Amharic, the lingua franca of Addis Ababa and other urban centers in Ethiopia, by one of the authors (F.T.). The translated instrument was then back-translated by 2 of the authors (S.S. and Y.A.T.), and the Amharic translation was revised. The revised Amharic tool was then pretested for face validity by 2 of the authors (K.C.M. and Y.A.T.) among a convenience sample of 6 community health volunteers who were not included in the subsequent quantitative study sample. Respondents with whom the HFIAS was pretested had no trouble understanding the items and responded clearly for each item. In addition, diet and the experience of FI were focal domains during a 20-mo parallel ethnographic study of volunteer HIV/AIDS caregivers in Addis Ababa, which provided additional support to the appropriateness of the content of the HFIAS.

Quantitative validation study sample. The revised Amharic language instrument was applied to a representative sample of community HIV/AIDS volunteer caregivers from 2 local non-governmental organizations (NGO), Hiwot HIV/AIDS Prevention, Control and Support Organization and Medhin Social Center, which cooperate with ALERT Hospital to provide home-based care for people with AIDS accessing treatment at the hospital. Hiwot is a well-known NGO that runs a large city-wide volunteer AIDS care program, with adequate numbers of volunteers to allow the drawing of a random sample at the community level. In contrast, Medhin is a small organization under the auspices of the Ethiopian Catholic Church. By including volunteers from these 2 different organizations, we intended that the study sample would be more diverse and therefore more representative of community health volunteers in Addis Ababa.

The full sample included 110 volunteer home-based caregivers (99 women and 11 men) of adult patients receiving treatment at ALERT Hospital. For the present analyses, we excluded male respondents on the assumption that they are not adequately familiar with their households’ food economies to respond to the HFIAS. This left a full sample of 99 women, incorporating the following subgroups: 48 randomly chosen participants who had been volunteering with the Hiwot organization for 12 mo at the time of the first data collection round; 32 randomly chosen participants who had just begun volunteering with Hiwot at the time of the first round survey; and all 19 female volunteer caregivers from the Medhin organization, with a mean service length of 12 mo at the time of the first round survey. The majority, but not all, of the participants in our study were heads-of-household in charge of daily meal preparation and food acquisition. Based on ethnographic evidence, we think that even those among our sample who were dependents within their households were nonetheless adequately engaged with their household food economy to respond to the HFIAS, given that they were adult women with substantial responsibilities for their household food economy.

A total of 99 participants were surveyed at round 1 (February/March 2008). At round 2 (July/August 2008), 96 of the original 99 participants were surveyed, and at round 3 (November/December), 96 of the original 99 were again surveyed, giving a 97% follow-up rate. Four Ethiopian research assistants, including 2 of the authors (S.S. and Y.A.T.), were trained for data collection methods at rounds 1, 2, and 3. Data collection was conducted in pairs. Initial training, refresher training, and the data collection “buddy system” aimed to maximize data quality.

Household income. At rounds 2 and 3 (but not round 1), participants reported household composition (i.e. people sleeping and eating on a regular basis in the house). Monthly incomes (in Ethiopian Birr) from all income-generating members of the household were also collected at rounds 2 and 3 and the incomes of all income generators were added to calculate a total household income. This total was then divided by the total number of people in the household (adults and children) to yield a monthly household per capita income (Birr/mo). At all rounds, participants also estimated an overall household income; at rounds 2 and 3, this was done prior to itemizing income by household member. When participants itemized household income, a mean service length of 12 mo at the time of the first round survey. The majority, but not all, of the participants in our study were heads-of-household in charge of daily meal preparation and food acquisition. Based on ethnographic evidence, we think that even those among our sample who were dependents within their households were nonetheless adequately engaged with their household food economy to respond to the HFIAS, given that they were adult women with substantial responsibilities for their household food economy.

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income by member, total household income was ~15% greater than when they estimated an overall household income. Because member-itemized household income was not reported at round 1, we adjusted round 1 incomes by adding 10% (a more conservative adjustment) to the reported value. Household composition was not reported at round 1, so we assumed that it had not changed from round 1 to round 2. Therefore, we divided the adjusted total monthly household income (in Birr) reported at round 1 by the total number of people in the household at round 2 to yield a monthly household per capita income for round 1. Finally, we categorized monthly per capita incomes at all 3 rounds according to U.S. dollars (USD)/d after dividing the raw data by 10 (1 USD = ~10 Birr) and then by 30 (the number of days in a month).

Organizational food support. At each round, respondents reported whether they were receiving food aid from governmental organizations or NGOs and what kinds of foods they were receiving as food aid. Because wheat grain or flour is the most common type of food available and accessed in large quantities as food aid and because it is often traded for cash by recipients, we categorized respondents based on whether they were receiving free wheat as food aid at the time of the interview.

Food intake. A 24-h food recall questionnaire, previously used with an urban Ethiopian population (15), was used to record the consumption of 12 local food categories during the previous day and night: meats, fish, eggs, dairy, vegetables, fruits, beans, cereals/bread, potatoes and other roots/tubers, oil/butter, sugar/honey, and coffee and other drinks. Respondents indicated whether or not they consumed each item but not the quantity they consumed. The 12 dichotomous items yielded a continuous variable ranging from 0 to 12, indicating increasing dietary diversity. Because many Ethiopians observe fasting days throughout the year, respondents were also asked if they were fasting from meat, fish, eggs, and/or dairy on the day before the interview. This was taken into account during analyses of intake for these types of food by excluding respondents who reported that they were fasting.

Validity criteria. As recommended by Frongillo (5) and following Perez-Escamilla et al. (6), there were 4 validity criteria established a priori: 1) an expected Chronbach α approaching 0.83; 2) parallelism on item response curves across income strata; 3) a clear-cut, dose-response relationship between income strata and level of FI; and 4) a clear-cut, dose-response relationship between level of FI and consumption of fruits, vegetables, meat, and dairy. We also sought to demonstrate a clear-cut, dose-response relationship between FI level and dietary diversity score. Finally, we addressed the dependability (as defined above) of HFIAS results across multiple assessment rounds.

Data analyses. SAS (version 9.2) was used to conduct all analyses. Participants were presented with “yes” or “no” response categories for each item of the HFIAS. Affirmative responses (pointing toward FI) were coded as 1 and negative responses were coded as 0. Items were then summed to create a HFIAS score ranging from 0 to 9. To minimize respondents’ distress in responding to sensitive questions and to save time (the HFIAS was administered amid a series of other surveys), the subquestions related to frequency of occurrence in Swindale and Bilinsky’s protocol were not included in the surveys and subsequent analyses. This may have biased the results, because in general it is helpful to distinguish whether specific conditions of FI are experienced 1 or 2 times compared with several times over the course of a month. Based on the very low income levels of our sample’s respondents, we think it is safe to assume that affirmative responses indicate that the specific food-insecure condition occurred more than just 1 or 2 d in the past 30 d.

Chronbach’s α internal consistency tests were conducted at all 3 rounds. Households were classified into 4 levels of FI according to the following scheme, which closely parallels the categorization scheme outlined in the published HFIAS protocol guide despite our elimination of the subquestions related to frequency of occurrence: 1) food secure (respondent answered “yes” to none of the items); 2) mild FI (respondent answered “yes” to item 1, 2, 3, or 4, but not items 5–9); 3) moderate FI (respondent answered “yes” to item 5 or 6, but not items 7–9); and 4) severe FI (respondent answered “yes” to item 7, 8, or 9). This scheme allows the reporting of household FI (access) prevalence for each level of FI.

To test the parallelism of the item response curves at all 3 rounds, we plotted the percentage of “yes” responses to each of the 9 FI scale items across the 4 household per capita income strata. The associations of FI severity level with household per capita income level and other covariates were tested with extended Mantel-Haenszel chi-square statistics using the CMH option in the FREQ procedure, invoking modified ridit scores for unequally spaced response levels and controlling for round where appropriate (16). A Cochran-Armitage trend test was used to test for change in the percentage of households receiving free wheat as food support, using the TREND option in the FREQ procedure. Generalized estimating equations (GEE) accounting for intra-individual correlation of repeated measures, using the GENMOD procedure, were also used to observe the associations of measured covariates and data collection round with FI. Significance was based on a 2-sided $P \leq 0.05$. Values in the text are means ± SEM and percentages.

Results

Sample characteristics. Respondents in the sample ranged in age from 18 to 45 y (28 ± 6 y). Length of schooling was 10 ± 2.6 y. The percentage of respondents who reported receiving free wheat as food support decreased over rounds 1, 2, and 3, from 41 to 21 to 9%, respectively ($P < 0.0001$) (Table 1).

Gross household income, in Birr, ranged from 476/mo at round 1 to 571/mo at round 3. Per capita income, in Birr, ranged from 110/mo at round 1 to 127/mo at round 3. This corresponds roughly to per capita incomes of 0.37 USD/d at round 1 and 0.42 USD/d at round 3. Respondents were categorized based on their daily per capita income (in USD) into the following levels: <0.167 USD (poorest = 1); 0.167–0.333 USD (more poor = 2); 0.333–0.667 USD (less poor = 3); and >0.667 USD (least poor = 4).

Internal consistency and parallelism. Chronbach’s α at rounds 1, 2, and 3 were 0.85 ($n = 284$), 0.84 ($n = 96$), and 0.83 ($n = 96$), respectively. With very minor exceptions, the HFIAS item response curves were parallel across per capita income strata, indicating that the likelihood of an affirmative response to most items increased as monthly per capita income decreased (Fig. 1). The trends for all items across per capita income strata were significant ($P < 0.02; n = 284$).

FI severity and household per capita income. With food security as the outcome, a clear-cut, dose-response trend was
observed in relation to per capita income level. This trend was significant when controlled for round (P < 0.0001; n = 284). With severe FI as the outcome, a dose-response trend was observed in the opposite direction in relation to per capita income level, with minor deviation between the 2 highest (less poor and least poor) per capita income levels (Fig. 2). This trend was significant when controlled for round (P = 0.0006; n = 284).

In a linear GEE model accounting for repeated measures on participants, household per capita income was inversely associated (P, 0.0001) with HFIAS score. Further, the parameter estimates for the various per capita income strata revealed a clear dose-response relationship with FI, with each level having a significant effect on HFIAS score in the expected manner (P, 0.02) (Table 2).

**FI level and food intake.** Dose-response trends between FI level and likelihood of previous-day consumption of various foods were observed for meats (not including fish), vegetables, and fruits, with minor deviations between moderate and severe levels of FI (data not shown). For example, among respondent households that were severely food insecure, the likelihood of previous-day consumption of meat was 8.3% aggregated over the data collection rounds compared with 26.3% for food-secure households. Controlling for round, the observed trends were significant for meat (P < 0.04; n = 236), vegetables (P < 0.02; n = 291), and fruits (P < 0.001; n = 291).

The analyses also detected foods that were insensitive to FI level, such as beans, which are a staple of local diets, and dairy, which is much less commonly consumed. For cereals, the likelihood of previous-day consumption was 100% for all FI levels at all 3 rounds; this is because the cereals category included teff, a staple grain of local diets, as well as wheat, which has become nearly ubiquitous in Addis Ababa.

Increasingly severe FI was associated with lower dietary diversity according to a GEE modeling the 4-level ordinal outcome of FI level (P < 0.001; n = 236). Mean dietary diversity scores did not differ over time (6.2 ± 1.2, 6.3 ± 1.5, and 6.4 ± 1.2 at rounds 1, 2, and 3, respectively).

### Table 1

<table>
<thead>
<tr>
<th>Sample descriptive characteristics of volunteer HIV/AIDS caregivers in Addis Ababa, Ethiopia, by round of data collection</th>
<th>Round</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>n</td>
<td>99</td>
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<tr>
<td>Respondent age, %</td>
<td></td>
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<tr>
<td>18–24 y</td>
<td>29.3</td>
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<tr>
<td>25–31 y</td>
<td>39.4</td>
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<tr>
<td>32+ y</td>
<td>31.3</td>
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<tr>
<td>Schooling, y</td>
<td>10.2 ± 2.6</td>
</tr>
<tr>
<td>Marital status, %</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>45.5</td>
</tr>
<tr>
<td>Unmarried</td>
<td>26.3</td>
</tr>
<tr>
<td>Separated/divorced/widowed</td>
<td>28.3</td>
</tr>
<tr>
<td>Gross household income, Birr/mo</td>
<td>476.3 ± 391.3</td>
</tr>
<tr>
<td>Per capita household income, Birr/mo</td>
<td>110.3 ± 90.8</td>
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<tr>
<td>Per capita household income, %</td>
<td></td>
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<tr>
<td>&lt;0.167 USD/d</td>
<td>20.7</td>
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<tr>
<td>0.167–0.333 USD/d</td>
<td>37.0</td>
</tr>
<tr>
<td>0.333–0.667 USD/d</td>
<td>32.6</td>
</tr>
<tr>
<td>&gt;0.667 USD/d</td>
<td>9.8</td>
</tr>
<tr>
<td>FI level, %</td>
<td></td>
</tr>
<tr>
<td>Food secure</td>
<td>16.2</td>
</tr>
<tr>
<td>Mild FI</td>
<td>22.2</td>
</tr>
<tr>
<td>Moderate FI</td>
<td>38.4</td>
</tr>
<tr>
<td>Severe FI</td>
<td>23.2</td>
</tr>
<tr>
<td>Receiving wheat as food support, %</td>
<td>41.4</td>
</tr>
<tr>
<td>HFIAS score</td>
<td>3.8 ± 2.7</td>
</tr>
<tr>
<td>Dietary diversity score (0–12)</td>
<td>6.2 ± 1.2</td>
</tr>
<tr>
<td>1 Values are % or means ± SEM.</td>
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</tr>
</tbody>
</table>

Fl severity and food support. Wheat as food support was concentrated on respondent households that were moderately or severely FI, which accounted for 65% of households receiving free wheat (P = 0.01; n = 291). HFIAS score was also a significant predictor of receiving wheat as food support in a GEE model accounting for repeated measures on participants and controlling for per capita income (P = 0.02).

Fl over time. The mean HFIAS score decreased slightly over the 3 data collection rounds, ranging from 3.8 ± 2.7 at round 1 to 3.5 ± 2.5 (round 2) to 3.3 ± 2.5 (round 3) (P = 0.04). The combined prevalence of moderate and severe FI decreased from 61.6% at round 1 to 50.0% at round 3 (P = 0.02; Fig. 3).

Discussion

Findings from this study indicate that an adapted version of the HFIAS is a valid tool for assessing FI among community health volunteers in Addis Ababa, Ethiopia. The content of the scale did not need to be changed during the translation process and the face validity was assessed in pretest interviews with target community members. The internal consistency of the scale was very good, with Chronbach’s α at or approaching a commonly accepted cutoff for judging the level of consistency (.5).

Very minor deviations from parallelism among affirmative scale item response curves across per capita income strata were observed for some items in the scale, but these deviations do not necessarily suggest that interpretations of these HFIAS items were different across the socioeconomic spectrum. We think this is partly because the daily per capita income strata into which respondents were categorized indicated such small real differences that they had minor consequences in terms of accessing a sufficient diet. In other words, the strata only designated gradations of extreme poverty. Even among the least poor stratum, the mean per capita household income was ~1 USD/d. That the HFIAS was still able to discriminate between these income strata in the current sample bolsters our confidence that it is a valid tool for the assessment of FI.

The stability in mean dietary diversity score over time seems to suggest that the food crisis did not affect respondents’ diets. Because the food intake items used to generate the food diversity score were qualitative (i.e. yes/no) and not quantitative, however, we are unable to address the possibility that participants reduced the amounts of foods they ate, if not the diversity of their diets, in response to the food crisis. A more detailed analysis that would allow us to determine whether certain food types were substituted by lower-ranked foods to maintain dietary diversity is beyond the scope of this paper. There was, nonetheless, a significantly improving trend in FI over the 3 data collection rounds (Fig. 3). Dependability, as defined by Froğililo (.5), means that any temporal change or lack thereof in reported FI should be explained by pertinent ecological factors in the context of validating a FI scale. In the present study setting, such factors included changes in: 1) local food prices (which respond to global food and fuel prices as well as local seasonal cycles); 2) per capita income; and 3) availability and distribution of food aid.

Changing food prices. Following a general trend of increasing food prices during 2005–2007 in Ethiopia, the year 2008 was characterized by record highs during the first 8 mo, followed by somewhat attenuated prices during the latter part of the year (12). Figure 3 illustrates the mismatch between the trends in prices of 7 grains in Addis Ababa wholesale markets (17) and volunteer caregivers’ reports of moderate and severe FI in the present study. In July 2008, mean prices of sorghum (white and red), wheat (white), teff (red), barley (white and mixed), and maize had risen roughly 80% over their February 2008 levels and during December 2008 were lower but still 54% over their February 2008 levels. Thus, we might expect the prevalence and severity of FI to be lowest at round 1 and highest at round 2, with levels at round 3 intermediate. However, this was not the pattern observed.
**Changing per capita income.** This mismatch between food prices and FI severity is not explained by change in per capita income. The change in per capita income over the study period (~0.07 USD/d) was not significant. One limitation of this study, however, was that respondents reported their household compositions at rounds 2 and 3 only; thus, we had to assume that household composition at round 1 was the same as at round 2 to calculate per capita incomes at round 1, after adjusting round 1 incomes by adding 10% to self-reports.

**Availability and distribution of food aid.** Rising food prices also had indirect effects on respondents' access to sufficient diets. As a result of high global food and fuel prices, which peaked during the northern hemisphere’s summer (the local rainy season) of 2008, food “aid” supplies dwindled globally and in Addis Ababa. This situation prompted the government of Ethiopia to purchase wheat on the world market and provide it to urban households and millers at a subsidized price, starting in mid-2008. A limitation of this study is that we did not assess the distribution of government-subsidized wheat access in our sample, which could have helped to buffer some households from increasing FI. Nevertheless, we found that the percentage of respondent households receiving free wheat as food aid from NGOs dropped steeply, from 41.4% at round 1 to 9.4% at round 3. This trend might also lead us to expect an increase in the prevalence and severity of FI over the 3 data collection rounds. The fact that the HFIAS performed well according to validation standards, yet ostensibly “failed” to dependably reflect changes in the ecology of household FI over 2008, presents a paradox. We suggest this paradox can be resolved by appealing to 2 self-report-related phenomena that arise in longitudinal studies: 1) observation bias, in which respondents change their reports according to changing perceptions of the observer-respondent relationship or change their behavior in ways that ameliorate FI status according to their reports at baseline; and 2) “response shift” (18), in which respondents change their reports according to reassessment of internal standards related to food security.

**Observer bias.** It is possible that at round 1, participants in our study had stronger expectations that their answers to the HFIAS would bear on their eligibility to receive money or food from the researchers; participants may then have become more convinced at rounds 2 and 3 that their responses would not have any bearing on their eligibility for food or monetary support. Of course, we attempted to minimize such expectations in the process of obtaining informed consent for the research prior to the first round survey. Another potential issue is that of stochastic time-varying covariates that respondents can voluntarily alter, which are an issue in many longitudinal observational studies (19,20). For instance, the assumption of stochasticity is violated if subjects with high HFIAS scores at baseline subsequently change their behavior so as to mitigate their FI situation, while subjects with the same propensity to FI-mitigating behaviors at baseline, but with low HFIAS scores, maintain their usual levels of FI-mitigating behaviors. Theoretically speaking, FI-mitigating behaviors (i.e. behaviors that improve food access) are not simply voluntary, but are heavily constrained by socioeconomic factors. Therefore, this phenomenon probably does not play a major role in explaining the results from this study, but it cannot be ruled out.

**Response shift.** The trend in reported FI may be explained in part by recognizing the potential impact of coming into contact with people who are perceived to be hungrier, more marginalized, and more vulnerable, which is at the heart of the volunteer caregiver role, as indicated by our ethnographic work. We hypothesize that this role has a strong impact on volunteers' assessments of their own households' FI situation. This hypothesis is supported in part by the lack of an observed change in dietary diversity despite the significant improvement in reported FI. This is consistent with the idea of a response shift effect that comes from engaging in peer support, as described by Sprangers and Schwartz (18). In the case of FI, response shift can be defined as a psychological aspect of adaptation, which involves shifting internal standards, values, social comparisons, and concept definitions regarding FI.

Researchers in the social and health sciences studying subjective measures of well-being, including FI, must recognize the systematic role that response shifts potentially play in a particular study and the scientific or inferential implications of such response shifts according to study goals. For example, if the goal of a study is to assess the prevalence of different levels of FI severity to indicate nutritional risk, then response shifts in reported FI may lead to misclassifications and underestimates of nutritional risk. Yet if the goal is to determine the association of FI and common mental disorders, which is increasingly of interest in international health research (21–29), then response shifts may reflect actual decreases in experienced insecurity, depression, and anxiety. Future research is needed to determine to what extent the relationship between FI and common mental disorder is mediated by social comparisons.

Response shift may also be important in designing FI interventions. On the one hand, response shifts may lead to misclassification of some (but not necessarily all) households, confounding interventions to reduce exposure to FI and diverting resources away from those who need them. On the other hand, response shifts may be a goal of interventions designed to reduce the anxiety associated with FI and thus reduce the risk of common mental disorders.

Keeping in mind the limitations of this study, we suggest that the HFIAS performed well in terms of classifying household FI and that our surprising longitudinal results can be explained according to the biases and response shift process discussed above. Additionally, it is possible that rising food prices in Ethiopia over the 3 y prior to 2008 (12) led to high prevalence of moderate and severe FI among households in our sample. Against this historical backdrop, the food price spike of 2008, although striking to observers, may not have had commensurate added effects on the experience of FI for these households. Future research should address these issues by comparing multiple objective and subjective measures of FI, including food intake and dietary diversity, to understand how different measures of the same construct vary and covary over time.

Some may regard our focus on community health volunteers as a limitation to a study of FI scale validity, because members of our sample are not representative of the general population of Ethiopia's capital city. This study of FI was in fact only one aspect of ethnographic and epidemiologic investigation of mental health among volunteer caregivers for people living with AIDS in Addis Ababa, in which we aim to highlight the theoretical and practical importance of applied understandings of this urban subgroup. As highly-active antiretroviral therapy has become available in areas of sub-Saharan Africa that lack the infrastructure, health professionals, and resources to ensure its effective prescription, home-based care programs have evolved to rely on volunteer workforces (30). These same settings often bear a high prevalence of FI, important links among health...
disparities related to FI, nutrition, and HIV/AIDS are increasingly recognized (31).

We conclude by highlighting the high prevalence of FI in this urban sample of volunteer caregivers and call for future inquiries into this novel perspective on HIV-FI interactions. We also note the intriguing possibility that FI instruments may be prone to response shifts in situations where individuals repeatedly interact with those less fortunate. Response shifts may lead to misclassification of FI households as food secure. As low-income volunteer health workers become an increasing part of the African and, indeed, global health work force, situations that are prone to induce response shifts will become increasingly common. More research is needed to ensure that existing instruments accurately and dependably assess the FI situation of these individuals. This is important for ensuring the well-being of not only volunteers but also those for whom they care.

**Literature Cited**