

# Measuring food insecurity and hunger in Peru: a qualitative and quantitative analysis of an adapted version of the USDA's Food Insecurity and Hunger Module

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## Abstract

*Objective:* To adapt a scale to measure perceptions on food insecurity and hunger among households in urban and rural communities in Peru.

*Design:* Qualitative and quantitative methodology including consultation with regional experts, key informant interviews and focus groups. A field survey trial was conducted in urban and rural communities using an adapted version of the US Department of Agriculture (USDA) Food Insecurity and Hunger Module (FIHM).

*Setting:* Five communities in three regions in Peru – Lima (coast), Ayacucho (Andean highlands) and San Martín (Amazon basin).

*Subjects:* The qualitative component included forty intentionally selected people (fourteen key informants and twenty-six focus group participants). For the quantitative component 300 households that complied with selection criteria (poor or non-poor with at least one child below 12 years of age) were surveyed.

*Results:* Qualitative research showed that concern about food availability and access was common among the three regions but its main cause varied across them. Participation in food aid programmes was a strategy to face constraints in food access. Mothers' perceptions on the importance of balanced meals varied across households from different regions. Quantitative results showed robust findings for the reliability of the adapted FIHM's fifteen-item scale ( $r > 0.863$ ). In addition, descriptive results confirmed parallelism of item responses in the scale for variables such as farm ownership, family size and use of Communal Kitchens.

*Conclusions:* This mixed-method study allowed us to adapt the USDA module to assess food insecurity in Peru.

**Keywords**  
Food security  
Hunger  
Mixed-methods research  
Young Lives  
Peru

Eradication of extreme poverty and hunger is one of the UN Millennium Development Goals. Poverty and hunger are inexorably linked to food insecurity. The concept of food insecurity refers not only to the constraints regarding availability, access and the way food is used and prepared within the household, but also to perceptions about food-related topics such as insufficiency, inadequacy, access uncertainty, and social and cultural unacceptability of certain foods<sup>(1)</sup>. Hence, addressing food insecurity involves two dimensions referring directly to food (availability, access) and two to social and psychological aspects (certainty about food availability and access, social and cultural acceptance of food and its quality)<sup>(2)</sup>. Food insecurity has, in addition, been classified into chronic, seasonal or transitory<sup>(3,4)</sup>.

Measuring food insecurity is important for understanding why some families fail to meet their fundamental nutritional requirements, for improving aid focalization to

target families in greatest need, as well as for providing evidence to improve monitoring so that it takes into account the pertinence, efficiency, efficacy and sustainability of such efforts. Investigations on food insecurity have used at least five complementary procedures to measure the concept: (i) the FAO method combines food balance national sheets with household consumption surveys<sup>(5)</sup>; (ii) measurement of food insecurity using income and expenditure surveys<sup>(6)</sup>; (iii) measurement of energy intake according to the recall method, frequency of meals or direct measures<sup>(7,8)</sup>; (iv) anthropometric measures of the nutritional status of children<sup>(9,10)</sup>; and (v) qualitative methods to measure peoples' perceptions about food insecurity and hunger<sup>(11)</sup>.

The purpose of the present study was to develop an instrument to be used in the second round of the international panel study of poverty in childhood, Young Lives, to measure the perception and consequences of

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chronic, seasonal or transitory food insecurity at the household level. The instrument was based on the Food Insecurity and Hunger Module (FIHM) developed by the US Department of Agriculture (USDA)<sup>(11)</sup>. It is a standardized survey consisting of eighteen multiple-choice questions whose answers allow calculation of a scale of food insecurity and hunger. This Module has been translated to Spanish, validated<sup>(12)</sup> and adapted in countries such as Brazil<sup>(13)</sup>, Venezuela<sup>(14)</sup>, Bolivia<sup>(15)</sup> and Colombia<sup>(16)</sup>. At the time the study was planned, only those of Brazil and Venezuela were available. These instruments showed robust results and had undergone a process of adaptation to local culture that was considered to have contributed to their success. The present study aimed to adapt the USDA instrument to the Peruvian context using qualitative and quantitative methods.

### Experimental methods

Young Lives is a longitudinal research project on the changing nature of childhood poverty. The study tracks the lives and development of 12 000 children in Ethiopia, Peru, India (Andhra Pradesh) and Vietnam through qualitative and quantitative research over a 15-year period. Since 2002, the investigation has followed two cohorts in each study country. The younger cohort consists of 2000 children per study country aged between 6 and 18 months in 2002. The older cohort consists of approximately 1000 children per country aged between 7·5 and 8·5 years in 2002<sup>(17)</sup>.

The present research used both qualitative and quantitative methodology. Mixed methods permit intra-study corroboration, to elaborate and develop the analysis by providing richer detail and expanding its scope, and to initiate new lines of thinking through attention to surprises or paradoxes<sup>(18,19)</sup>. Qualitative research can inform quantitative research by providing conceptual aids, facilitating data collection processes, validating or clarifying concepts, and illustrating results. Quantitative research can support qualitative data by providing elements for the design and systematic data, and by avoiding the 'elite bias' which results from interviewing only the most educated or talkative.

### Qualitative phase

This phase included consultations with regional and local experts, as well as the design and validation of two data-gathering tools: key informant interviews and focus groups. Complementary ethnographic work was conducted during field visits. The interviews and focus groups took into account inter-regional geographical variations (coast, Andes and Amazon) and urban/rural stratification. Five areas similar to sampled clusters in the first data round of the Young Lives were intentionally selected. The selected sites included Huaycán (Lima);

urban and rural Socos (Ayacucho); and Banda de Shilcayo and Sapote (San Martín). Participants of both exercises were selected considering criteria such as being a family mother, living in the study zone and having at least one child below 12 years of age.

Key informant interviews were conducted with people who, because of their position in society, had relevant knowledge and opinions about the topic being investigated<sup>(20)</sup>. Interviews included fourteen informants such as community leaders, health personnel and professionals from non-governmental organizations (NGO). Information gathered was crucial for the initial cultural adaptation of main concepts included in the Module. Focus groups – a strategy for the in-depth collection of information about a specific topic based on the exchange of points of view of an intentionally selected group of a reduced number of individuals<sup>(21)</sup> – were useful to gain conceptual and methodological insight on issues concerning: (i) food insecurity patterns; (ii) food insecurity perceptions; (iii) notions on concepts such as 'balanced diet', 'sufficient food' and 'low-cost food'; and (iv) opinions regarding the language and formulation of the FIHM. Six focus groups were conducted with an average participation of 4·5 people each and a total of twenty-six participants. On average, participants had 5·2 years of schooling and were 33·5 years old. These results were used to adapt the Module in terms of wording, sequence and content while assuring the original nature of the questions.

Field-gathered qualitative data were registered using different audio-visual formats (tapes, digital photography and video). Data were processed and organized to proceed with content analysis. Since major themes were pre-identified and adjusted with the aid of key informants during the research process, the analysis followed a thematic approach by organizing and classifying the information into patterns, categories and smaller descriptive units<sup>(22)</sup>. The final output of this phase was an adapted FIHM comprising forty-seven multiple-choice questions in Spanish. This version was used for the quantitative data-gathering phase.

### Quantitative phase

The objectives of this stage were to conduct a methodological exercise to account for the internal validity of the Module's items and conduct exploratory data analysis on food insecurity and hunger in three regions in Peru. These were the same three regions visited for the qualitative validation but excluded participants of this phase to minimize response bias. A two-stage household sampling procedure was used allowing for a partially convenient and randomized selection process. Within each of the three regions, we selected communities closest to the qualitative sites with similar socio-economic characteristics. Within selected communities, a starting household was selected at random. Neighbouring households were visited in a systematic fashion until 100 of

them, with at least one child below 12 years of age, had been identified. The final sample consisted of 300 households equally distributed in each of the three regions. Though the sample was not regionally representative, it provided data on households similar to those of the qualitative study. Data were collected in November and December 2005.

The adapted FIHM included forty-seven questions organized as follows: (i) six on basic household socio-demographic data; (ii) sixteen corresponded to the 'core set' included in the USDA Module, one asks about the overall perception of household food security and fifteen are used to calculate the scale and correspond to four underlying factors (food supply anxiety, food quality anxiety, adults' food intake, children's food intake); (iii) four aimed at measuring additional dimensions of concern and anxiety around food access and quality; (iv) twelve corresponded to household access and use of food aid programmes; (v) five focused on household strategies to obtain food; and (vi) four explored household access to basic services.

In the FIHM, which measures the severity of food insecurity, the condition of 'fully secure', corresponding to absence of the measured condition, is assigned a scale value of zero. The most severe condition, represented by the occurrence of all indicators (items), is assigned a scale value approaching  $10^{(11)}$ . In the present study, the fifteen-item scale was transformed into a 10-point scale. The scale could be treated as either a continuous or a categorical measure of the severity of household food insecurity and hunger. When treated as continuous, the scale allowed for the highest level of precision and facilitated the use of statistical techniques such as correlation, regression and/or analysis of variance. When treated as categorical, thresholds established by the USDA could be used to facilitate the analysis: 'food secure' (from 0 to 2.32), 'food insecure without hunger' (from 2.33 to 4.56), 'food insecure with moderate hunger' (from 4.57 to 6.53) and 'food insecure with severe hunger' (from 6.54 to 10).

Quantitative data analysis was done using the SPSS statistical software package version 12.0 (SPSS Inc., Chicago, IL, USA). The analysis consisted of the use of descriptive and correlation statistical techniques to test for causal analysis. Internal validity and reliability analyses were done using the data-reduction technique known as principal components analysis (i.e. factor analysis) aimed at reducing the number of variables to detect the structure of relationships between items (i.e. classification). Reliability and principal components analysis were done to identify correlation among the different scale items.

Internal validation of the instrument was based on the coherence assessment of the scale as measured by Cronbach's  $\alpha$  greater than or equal to 0.85, parallelism on item response curves across socio-economic strata, and association between socio-economic strata and levels of food insecurity<sup>(23)</sup>. To measure the latter, we compared

with results from questions proving contextual data on farm ownership, family size and food aid programme access. Correlation analysis was performed to test linear association between the scale and the three above factors. Data were screened for outliers (i.e. extreme values which often cause misleading results). Pearson's correlation coefficients measured linear association.

The study, including both qualitative and quantitative phases, was approved by the independent research ethics committee of the Instituto de Investigación Nutricional, which has federal-wide assurance and is registered with the Instituto Nacional de Salud del Perú.

## Results

### *Qualitative phase*

Although concerns about food availability and access were common in the three study areas, causal factors varied across sites. In Lima, the challenges of food access were related to poverty, cultural practices and lack of information. In turn, in Ayacucho, the concerns were associated with seasonal variations in food availability. Finally, in San Martín, concerns were related to the availability, access and lack of food variety which reflected a monotonous diet (i.e. rice, beans, plantain and cassava).

Results showed additional differences in the certainty about being able to obtain food. Respondents in Lima and the urban zone of San Martín reported to 'live by the day', meaning that they are uncertain about whether they will have something to eat the following day. In Ayacucho, people indicated they usually keep dry food (i.e. beans, wheat and barley) for the time when they run out of fresh food. These 'savings' usually last for a year. In Andean areas the main concern regarding food availability related to weather hazards (i.e. rains, frosts, hailstorms) and potential crop loss.

To address constraints to food availability and access, participation in food aid programmes such as 'Communal Kitchens' and 'Glass of Milk' was considered a supplementary strategy. There was a clear difference in the attitudes of mothers living in communities where these alternatives were available compared with those where they were not. Whereas in the Lima site a Communal Kitchen was available, in urban San Martín there was not. Some of the comments expressed during focus groups in the latter site emphasized their lack of interest in participating in such initiatives due to time constraints. There was also misinformation about the benefits of adequate food intake among children.

On the other hand, mothers' knowledge and perceptions on food security and the importance of balanced meals varied across regions. In Ayacucho, mothers of one of the focus groups showed a high level of information regarding the different food groups as compared with those in Lima and San Martín. They attributed this to the

**Table 1** Item-by-item distribution on the Food Insecurity and Hunger Scale among selected households (*n* 300) in Lima, Ayacucho and San Martín, Peru, 2005

	Item	Item description	%	SD
Food supply anxiety	1	Worried whether food would run out	67.33	0.47
	2	Food that we bought just didn't last	54.33	0.49
Food quality anxiety	3	Could not afford to eat balanced meals	59.33	0.49
	4	Relied on only a few kinds of low-cost food to feed children	65.33	0.48
	5	Could not feed the children a balanced meal	57.33	0.49
Children's food intake	6	Children were not eating enough	5.33	0.23
Adults' food intake	7	Adult cut the size of meals or skipped them	12.00	0.33
	8	Eat less than felt should	16.67	0.37
	9	Hungry but did not eat	13.33	0.34
	10	Lose weight	6.33	0.24
	11	Adult did not eat for a whole day	4.67	0.21
	12	Cut the size of children's meals	14.00	0.35
Children's food intake	13	Children ever skip meals	12.00	0.33
	14	Children ever hungry	6.33	0.24
	15	Children did not eat for a whole day	0.33	0.06

nutritional training provided by NGO in the area. Field work also helped identify some perceptions, such as perceived nutritive value of meals, and practices regarding the strategies of food use at home, such as intra-household food allocation patterns and use of food aid programmes.

### Quantitative phase

Commonalities and differences were observable in the sample across sites. Almost nine out of every ten respondents were young females, especially in Lima and San Martín, with an average age of 33 years. Variation was observed across sites in the mean of years of schooling. Respondents in Lima showed that the average was 8 years while the averages were 3.9 and 4.8 years of schooling in rural Ayacucho and rural San Martín, respectively. As for household-related attributes, households in rural Ayacucho (98%) and San Martín (90%) were more likely to have dirt floors than those in Lima (52%). Mean family size was 5.7 members in Lima, 6.7 in Ayacucho and 4.9 in San Martín. No Lima families owned a farm, whereas this was common in Ayacucho (98%) and San Martín (40%).

### Descriptive analysis

Table 1 presents percentages and standard deviations for each scale item. Items 1 and 2 were related to food supply anxiety; items 3, 4 and 5 focused on food quality anxiety; items 7 to 11 reported on adults' food intake and/or its consequences; and items 6 and 12 to 15 were related to children's food intake and/or its consequences.

Over two of every three respondents admitted that, in the last 12 months, they had at least on one occasion been worried about food supply at home. Anxiety due to food quality was the most common concern among respondents. Almost three out of each five respondents indicated that they could not afford to buy, obtain or provide a balanced meal (i.e. based on qualitative results, this notion was usually understood as 'combined' or 'varied' meal, meaning it included a portion of carbohydrates,

proteins and micronutrients) for the family and/or their children. Approximately two out of every three respondents indicated that – even though they were knowledgeable about the possible adverse effects on health – they still relied on low-cost food for their children.

In addition, when observing the distribution of adult and child food intake-related items, contrary to what was expected and discussed during focus groups, children were as likely as adults, if not more, to have to cut the size of meals or even skip them due to lack of food at home. Finally, as part of the severity of food insecurity, over one out of every ten respondents reported that adults in the household had been hungry on at least one occasion in the last 12 months.

In terms of the food insecurity scale, values obtained results were somewhat skewed towards the lowest food insecurity scores and families with the highest scores were uncommon (7%). Overall 47% of families were in the 'food-secure' category. Although the frequency of low insecurity scores was similar across the three sites, more families in Lima were found to have the highest food insecurity scores (Table 2).

### Reliability and principal components analysis

Items in the scale were internally well correlated. Reliability analysis was conducted for the fifteen-item Food Insecurity and Hunger Scale and a Cronbach's  $\alpha$  of 0.86 was obtained. Although this result could suffice to account for internal validity of the scale, the underlying factors and Cronbach's  $\alpha$  values for each of the four themes in the scale were explored. Given that all scale items were projected to be highly inter-correlated, no additional principal components (i.e. factors) were extracted. Reliability analysis showed that, internally, items accounting for each of the four themes in the scale had Cronbach's  $\alpha$  values greater than or equal to 0.75 and, thus, were well correlated (factor 1, food supply anxiety,  $\alpha = 0.76$ ; factor 2, food quality anxiety,  $\alpha = 0.86$ ; factor 3, adults' food intake,  $\alpha = 0.84$ ; factor 4, children's food intake,  $\alpha = 0.75$ ).

**Table 2** Regional variation in scores on the Food Insecurity and Hunger Scale grouped by level of food insecurity among selected households (n 300), Peru, 2005

	Score*	Region of the country							
		Lima		Ayacucho		San Martín		Total	
		%	n	%	n	%	n	%	n
Food secure	0-00	14	14	17	17	19	19	16-67	50
	0-67	10	10	9	9	4	4	7-67	23
	1-33	11	11	8	8	12	12	10-33	31
	2-00	12	12	15	15	9	9	12-00	36
	Subtotal	47	47	49	49	44	44	46-67	140
Food insecure without hunger	2-67	9	9	12	12	20	20	13-67	41
	3-33	9	9	22	22	26	26	19-00	57
	4-00	8	8	9	9	1	1	6-00	18
	Subtotal	26	26	43	43	47	47	38-67	116
Food insecure with moderate hunger	4-67	5	5	3	3	2	2	3-33	10
	5-33	6	6	1	1	1	1	2-67	8
	6-00	3	3	0	0	1	1	1-33	4
	Subtotal	14	14	4	4	4	4	7-33	22
Food insecure with severe hunger	6-67	1	1	2	2	1	1	1-33	4
	7-33	2	2	0	0	2	2	1-33	4
	8-00	2	2	0	0	2	2	1-33	4
	8-67	6	6	2	2	0	0	2-67	8
	9-33	2	2	0	0	0	0	0-67	2
	Subtotal	13	13	4	4	5	5	7-33	22
Total		100	100	100	100	100	100	100	300

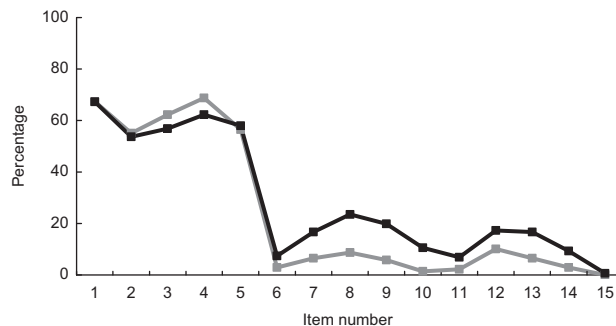
\*Scale from 1 to 10 constructed from the sum of positive replies to each item in the fifteen-item scale corrected to a maximum of 10.

*Parallelism on item response*

Based on results of the qualitative phase, three models to test parallelism on item response were selected. First, it was expected that families owning a farm would show lower item scores given that their levels of food access and availability, as well as their capacity to ‘save’ dry food, could facilitate feeding both adults and children throughout the year. Quantitative results confirmed that respondents owning a farm showed anxiety for food quality but had significantly lower scores in the level of concern on adult and child food intake than those who did not own a farm (Fig. 1).

The second model was performed to identify the relationship between scale item scores and family size. Respondents from the largest families were significantly more concerned than those in the other two categories and, although not as significant, showed differences in items related to perceptions and practices affecting food intake for both adults and children (Fig. 2). This is in accordance with evidence obtained by the FAO and International Food Policy Research Institute<sup>(24,25)</sup> on how larger families are associated with greater competition for resources including food access.

Third, given the importance of food aid programmes as a complementary source of food, the last model emphasized the association between item scores and the access to, specifically, Communal Kitchens<sup>(26)</sup>. The expectation was that those accessing them would be more likely to have higher scale item scores given their potential need to search for complementary food sources. Indeed, differences between groups were evident throughout items

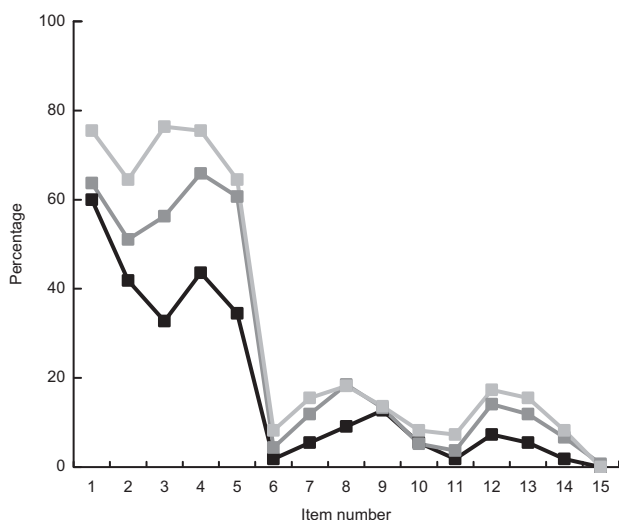


**Fig. 1** Item-based score on the Food Insecurity and Hunger Scale by farm ownership (—■—, owns a farm, n 138; —●—, does not own a farm, n 162) among selected households in Lima, Ayacucho and San Martín, Peru, 2005

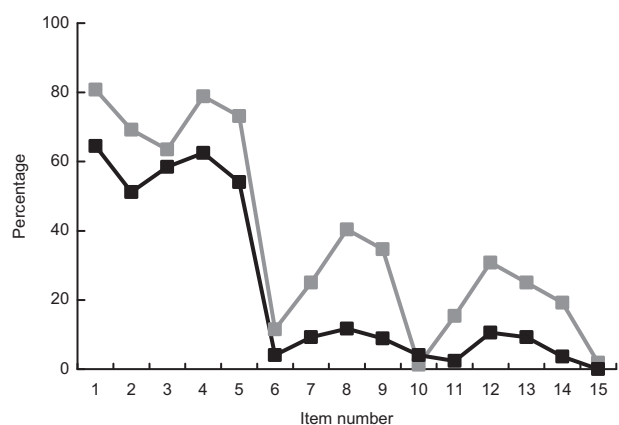
except in item 10 (i.e. lose weight) and 15 (i.e. children did not eat for a whole day; Fig. 3).

Finally, correlation analysis results demonstrated that the sign of observed associations coincided with the expected ones. Data confirmed the nature of the relationships between selected variables and scale values.

Operationally, with practice, the survey took approximately 12 to 15 min to apply. Field workers reported that, in general, it was easy to administer and families answered all questions, although respondents faced some difficulties understanding the subtle differences among questions that seemed similar. The period of reference (12 months) was chosen because of interest in capturing seasonal variations of food security especially among rural families. The instrument gathered expanded data



**Fig. 2** Item-based score on the Food Insecurity and Hunger Scale by family size (—■—, two or three people per household,  $n$  55; —■—, four or five people per household,  $n$  135; —■—, six or more people per household,  $n$  110) among selected households in Lima, Ayacucho and San Martín, Peru, 2005



**Fig. 3** Item-based score on the Food Insecurity and Hunger Scale by access to a Communal Kitchen (—■—, access to a Communal Kitchen,  $n$  52; —■—, does not have access to a Communal Kitchen,  $n$  248) among selected households in Lima, Ayacucho and San Martín, Peru, 2005

about the nature of food insecurity, family concern, expectations and practices. As an output of the exercise, an abridged version of the adapted FIHM was obtained to be used in the second data-gathering round of the Young Lives. Table 3 presents this module composed of twenty-six multiple-choice questions including the sixteen-question 'core set' and a subset of ten about additional food concern-related items, household strategies to obtain food, and access and use of food aid programmes.

In the quantitative study the proportion of households in the 'food-secure' group was similar across the three regions. However, more Lima households reported 'food insecurity with severe hunger' as compared with those of Ayacucho and San Martín (Fig. 4). Although in agreement

with the qualitative findings, a study with a representative sample would be needed to confirm whether this pattern is regionally representative.

For analytical purposes, we found it useful to transform the scale into categories when comparing across groups. However, the scale was best treated as continuous when used to correlate with other variables. Internal validity and reliability analyses were helpful and graphs facilitated understanding the results.

## Discussion

Cultural adaptation of the FIHM to the Peruvian context demonstrated similarities with other experiences in the region<sup>(13,14)</sup>. These were mainly related to the need to rephrase categories (i.e. balanced meal)<sup>(13)</sup> and identify adequate context-specific vulnerability indicators to correlate with the scale<sup>(14)</sup>. Internal validity results were robust (Cronbach's  $\alpha = 0.86$ ) and consistent with the findings of similar research studies conducted in Latin America<sup>(13,14,16)</sup>. In Venezuela and Brazil, in urban settings, reliability analyses produced  $\alpha$  coefficients of 0.92 and 0.91, respectively.

Conducting a mixed-method exercise had multiple advantages. Focus group discussions emphasized differences in attitudes and strategies related to the ability to obtain preferred or sufficient variety of food. In San Martín, focus groups revealed tolerance towards this situation without major actions taken to overcome it. In turn, in Ayacucho, the perceived lack of dietary quality led families to take action. This was observed in the attempts made at the community level to improve food access and availability of more varied diets through Communal Kitchens. As a result of these findings, specific questions addressing attitudes and strategies were added in the adapted module.

Qualitative findings were also useful to adjust the scale as per food-related anxiety indicators. In each of the three regions, a large proportion of informants expressed anxiety about whether they will have enough food to feed their children. However, there were differences in the anxiety time frame. Whereas in Lima families live 'by the day' and only have food reserves for one or two days, rural areas families tend to store food and have reserves available for several months. They experience anxiety about the long term and worry about crop failure or bad weather conditions. These differences in the quality of anxiety were not included in the original module and were part of the adaptation which resulted in including specific questions on food storage.

The questions on children's food intake were important as positive answers tended to identify the most severe cases of food insecurity as shown in Fig. 4. This is important because, in attempts to reduce the length, it is tempting to cut child-related items. Our findings, however, suggest that at least some questions should be

**Table 3** Adapted version of the US Department of Agriculture Food Insecurity and Hunger Module

- 1.** Which of the following statements better describes the food situation at your home in the last 12 months? (*Choose one answer*)
1. We always eat enough of what we want (>> Q2)
  2. We eat enough but not always what we would like (>> Q1b)
  3. We sometimes do not eat enough (>> Q1a)
  4. We frequently do not eat enough (>> Q1a)
  5. Do not know/No answer
- 1a.** Why do you not eat enough at home? (*Choose all answers that apply*)
1. We do not have enough money to buy food: \_\_\_\_\_
  2. It is difficult to access the store: \_\_\_\_\_
  3. We are dieting: \_\_\_\_\_
  4. We do not have a stove that works: \_\_\_\_\_
  5. We cannot eat/cook due to health reasons: \_\_\_\_\_
  6. We have not stored enough food for the year: \_\_\_\_\_
  7. Other: \_\_\_\_\_ (specify)
- 1b.** Why do you not obtain the types of food you would like or need? (*Choose all answers that apply*)
1. We do not have enough money to buy food: \_\_\_\_\_
  2. It is difficult to access the store: \_\_\_\_\_
  3. We are dieting: \_\_\_\_\_
  4. The food we would like is not available: \_\_\_\_\_
  5. There is no quality food: \_\_\_\_\_
  6. We only have what we stored from the previous harvest: \_\_\_\_\_
  7. Other: \_\_\_\_\_ (specify)
- 2.** In the last 12 months, have you been worried because food at home could run out before you could get more? (*Choose one answer. 'Almost every month' = between 8 and 12 months; 'Some months' = between 3 and 7 months*)
1. Almost every month
  2. Some months
  3. Only one or two months
  4. Did not happen
  5. Do not know/No answer
- 3.** In the last 12 months, how often did it happen that the food you bought/obtained did not last enough time and there was no money to obtain more? (*Choose one answer*)
1. Almost every month
  2. Some months
  3. Only one or two months
  4. Did not happen
  5. Do not know/No answer
- 4.** In the last 12 months, did you have enough to eat varied or combined meals? (*Choose one answer*)
1. Almost every month
  2. Some months
  3. Only one or two months
  4. Did not happen
  5. Do not know/No answer
- 5.** In the past 12 months, did you have to feed your children with lower-cost food than usual because food ran out at home and it was difficult to buy/obtain higher-cost food?
1. Almost every month
  2. Some months
  3. Only one or two months
  4. Did not happen
  5. Do not know/No answer
- 6.** In the last 12 months, how often did it happen that you did not have enough to feed your children with varied, combined and healthy meals? (*Choose one answer*)
1. Almost every month
  2. Some months
  3. Only one or two months
  4. Did not happen
  5. Do not know/No answer
- 13.** In the last 12 months, did you have to reduce your children's food portions because there was not enough food at home? (*Choose one answer*)
1. Yes
  2. No
  3. Do not know/No answer
- 14.** In the last 12 months, did any of your children have to not eat because there was not enough food at home? (*Choose one answer*)
1. Yes (>> Q14a)
  2. No (>> Q15)
  3. Do not know/No answer (>> Q15)
- 14a.** How often did this happen? (*Choose one answer*)
1. Almost every month
  2. Some months
  3. Only one or two months
  4. Do not know/No answer
- 15.** In the last 12 months, did any of your children go hungry but there was no more food at home? (*Choose one answer*)
1. Yes
  2. No
  3. Do not know/No answer
- 16.** In the last 12 months, did any of your children did not eat for the whole day because there was not food at home? (*Choose one answer*)
1. Yes
  2. No
  3. Do not know/No answer
- 17.** For how long do you think you have the food for your family guaranteed? (*Choose one answer*)
1. Do not know whether food would be available tomorrow
  2. For one week
  3. For one month
  4. For six months
  5. For a year or more
- 18.** What is your biggest concern regarding lack of food? (*Choose one answer*)
1. Not knowing if money would be available to buy/obtain food
  2. Not accessing quality food
  3. The possibility of lack of rain or similar weather event
  4. Do not have any concern
  5. Other: \_\_\_\_\_ (specify)
- 19.** In general, does your family's food access vary throughout the year? (*Choose one answer*)
1. Yes, due to economic reasons or lack of stable jobs
  2. Yes, due to lack of food
  3. Yes, due to other reasons: \_\_\_\_\_ (specify)
  4. No
  5. Do not know/No answer

**Table 3.** *Continued*

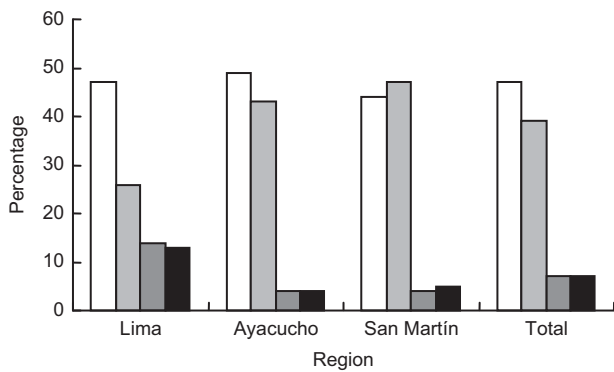
<p><b>7.</b> In the last 12 months, how often did it happen that your children did not have enough to eat due to lack of food at home? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Almost every month</li> <li>2. Some months</li> <li>3. Only one or two months</li> <li>4. Did not happened</li> <li>5. Do not know/No answer</li> </ol>	<p><b>20.</b> What do you do when there is not enough to eat at home? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Go to the Communal Kitchen and buy food</li> <li>2. Go to the Communal Kitchen and ask for food loan</li> <li>3. Go to neighbour/relative and ask for money loan</li> <li>4. Reduce portions or skip meals</li> <li>5. Go to the store and ask for a food loan</li> <li>6. Does not happen</li> <li>7. Other: _____ (specify)</li> </ol>
<p><b>8.</b> In the last 12 months, did you or other adults have to eat less than usual or not eat because there was not enough food at home? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Yes (&gt;&gt;Q8a)</li> <li>2. No (&gt;&gt;Q9)</li> <li>3. Do not know/No answer (&gt;&gt;Q9)</li> </ol>	<p><b>21.</b> In the last 12 months, did you go to the Communal Kitchen programme in your area? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Almost every month (&gt;&gt;Q22)</li> <li>2. Some months (&gt;&gt;Q22)</li> <li>3. Only one or two months (&gt;&gt;Q22)</li> <li>4. No (&gt;&gt;Q23)</li> <li>5. Do not know/No answer (&gt;&gt;Q24)</li> </ol>
<p><b>8a.</b> How often did this happen? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Almost every month</li> <li>2. Some months</li> <li>3. Only one or two months</li> <li>4. Do not know/No answer</li> </ol>	<p><b>22.</b> What is the main reason you go to the Communal Kitchen programme? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. To complement your meals</li> <li>2. It is cheap</li> <li>3. Do not have time to cook</li> <li>4. There is no one to cook at home</li> <li>5. Do not have kitchen at home</li> <li>6. Other: _____ (specify)</li> </ol>
<p><b>9.</b> In the last 12 months, did you eat less than you thought you should to be healthy because there was not enough food at home? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. Do not know/No answer</li> </ol>	<p><b>23.</b> What is the main reason you do not go to the Communal Kitchen programme? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>0. There is no Communal Kitchen in this area</li> <li>1. Do not have time to participate</li> <li>2. Do not perceive a clear benefit</li> <li>3. The do not offer quality food</li> <li>4. They do not allow new members</li> <li>5. Do not need it</li> <li>6. Other: _____ (specify)</li> </ol>
<p><b>10.</b> In the last 12 months, were you ever hungry but did not eat because there was not enough food at home? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. Do not know/No answer</li> </ol>	<p><b>24.</b> In the last 12 months, have your children benefited from the Glass of Milk programme? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Almost every month (&gt;&gt;Q25)</li> <li>2. Some months (&gt;&gt;Q25)</li> <li>3. Only one or two months (&gt;&gt;Q25)</li> <li>4. No (&gt;&gt;Q26)</li> <li>5. Do not know/No answer (&gt;&gt;END)</li> </ol>
<p><b>11.</b> In the last 12 months, did you lose weight because you did not have enough food to eat at home? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. Do not know/No answer</li> </ol>	<p><b>25.</b> What is the main reason your children benefit from the Glass of Milk programme? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Because milk cannot be replaced</li> <li>2. To complement their meals</li> <li>3. Other: _____ (specify)</li> </ol>
<p><b>12.</b> In the last 12 months, did you or other adult at home not eat the whole day because there was not enough food at home? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Yes (&gt;&gt;Q12a)</li> <li>2. No (&gt;&gt;Q13)</li> <li>3. Do not know/No answer (&gt;&gt;Q13)</li> </ol>	<p><b>26.</b> What is the main reason your children do not benefit from the Glass of Milk programme? (<i>Choose main (M) and secondary (S) reasons – two answers should be registered here</i>)</p> <ol style="list-style-type: none"> <li>0. There is no Glass of Milk programme in this area</li> <li>1. Do not have time to participate</li> <li>2. Do not perceive a clear benefit</li> <li>3. Do not have children in the required age group</li> <li>4. The Programme has organization problems</li> <li>5. Other: _____ (specify)</li> </ol>
<p><b>12a.</b> How often did this happen? (<i>Choose one answer</i>)</p> <ol style="list-style-type: none"> <li>1. Almost every month</li> <li>2. Some months</li> <li>3. Only one or two months</li> <li>4. Do not know/No answer</li> </ol>	

maintained because of their importance in identifying the most vulnerable and food-insecure families.

In summary, the qualitative and quantitative research process allowed improvement of the original instrument so that it was easily understood by informants and captured the full diversity of household food insecurity in Peru. It could be argued that there are currently sufficient validated

instruments in Latin America; nevertheless the adaptation did result in adjustments which included changes in question wording and inclusion of new variables, for instance strategies and food aid programmes. Previous versions used in Brazil, Venezuela and Bolivia have not included questions about perceptions or use of food aid, which facilitate understanding of household coping strategies to food





**Fig. 4** Percentage of households ( $n$  300) in Food Insecurity and Hunger Scale categories by region (□, food secure, score = 0–2.32; ▒, food insecure without hunger, score = 2.33–4.56; ▓, food insecure with moderate hunger, score = 4.57–6.53; ■, food insecure with severe hunger, score = 6.54–10), Peru, 2005

insecurity and have policy implications. While adapting food insecurity instruments might not be necessary in every context, our study contributed new information that added to an ongoing process of development of an instrument to measure perceptions and attitudes about food insecurity in the region.

In conclusion, this mixed-method study enabled us to generate an adapted version of the USDA module that was useful to explore and assess food insecurity levels in Peru. Methodologically, internal validity of the scale was robust. Values of Cronbach's  $\alpha$  were above the expected levels and parallelism on item response showed a similar pattern of food insecurity severity across groups when analysed by selected independent variables considered to be proxies of socio-economic status and poverty.

Results obtained cast doubt on some of the preconceived notions about food security in Peru. Contrary to the popular belief, for instance, in our sample Lima households did not have the best food access, availability and/or consumption patterns. The study highlighted the possibility that food security in the city is just as, if not more, precarious than in other regions in the country. The new instrument has the capability of exploring this possibility. This highlights the utility of combining the standard measures about food access and consumption together with additional information to broaden understanding of the situation and also inform policy.

Finally, although this exercise was conducted in only a few sites and this might have been a limitation, the adapted instrument that resulted is ready for a larger-scale validation in the context of the Young Lives in Peru. This is expected to produce valuable information for policy making.

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