

# Measuring Food Insecurity During the Young Lives COVID-19 Phone Surveys

Douglas Scott



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First published by Young Lives in March 2022

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## **About Young Lives**

Young Lives is an international study of childhood poverty and transitions to adulthood, following the lives of 12,000 children in four countries (Ethiopia, India, Peru and Vietnam) since 2001. [www.younglives.org.uk](http://www.younglives.org.uk)

Young Lives is funded by UK aid from the UK Government.

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## The author

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# 1. Measuring food insecurity during the COVID-19 phone surveys

Throughout Young Lives, we have provided various measures of food insecurity. These include the Household Food Insecurity Access Scale (HFIAS), developed by the Food and Nutrition Technical Assistance Project (FANTA) (Coates, Swindale, and Bilinsky 2007), but also stand-alone questions, such as ‘Was there ever no food to eat in your household because of a lack of money?’ which was employed across different survey rounds in all four Young Lives study countries: Ethiopia, India (the states of Andhra Pradesh and Telangana), Peru and Vietnam.<sup>1</sup>

In response to the global COVID-19 pandemic, we conducted the Listening to Young Lives at Work: COVID-19 phone survey<sup>2</sup> to record the experiences of young people during the outbreak.<sup>3</sup> To estimate food insecurity in the four study countries we utilised the Food and Agricultural Organisation’s (FAO) Food Insecurity Experience Scale (FIES) (Cafiero, Viviani, and Nord 2018). This technical note provides information on how estimates of food insecurity were calculated using the FIES approach, in a manner comparable to the methods used by the FAO to inform the United Nation’s Sustainable Development Goal (SDG) food security indicator.

The phone survey comprised three calls, and a module on food insecurity was included in the second and third calls. In the second call (August–October 2020), we asked respondents to indicate their experiences of food insecurity based on the eight FIES questions (items) listed in Table 1. In the third call (November–December 2020), we replaced the recall period of [outbreak date] with [the previous 12 months]. In each case, the answers to this module provided us with eight ‘yes’ or ‘no’ responses (coded 1 and 0) for each individual. From these responses, we were able to estimate the sample prevalence of both *moderate or severe* food insecurity, and *severe* food insecurity for three of the four countries.

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<sup>1</sup> Table A1 in the Appendix reports the questions previously used to provide an indication of food insecurity in the standard (in-person) survey rounds.

<sup>2</sup> For more details of the Listening to Young Lives at Work project, see <https://www.younglives.org.uk/research-project/young-lives-work>

<sup>3</sup> Table A2 reports questions on food insecurity asked during the COVID-19 phone surveys.

## 2. The Food Insecurity Experience Scale (FIES)

Estimation of the sample prevalence of food insecurity, based on the FIES, begins from the assumption that each of the eight items corresponds to a value of (sample-specific) severity located along a one-dimensional scale. We also assume that a value of the severity characterising the experiences of food insecurity for each sampled individual can also be located on this scale. Based on the individual responses to the eight items obtained during the survey, it is possible to fit a single-parameter logistic (Rasch) model using maximum likelihood estimation (Engelhard Jr 2013). In doing so, we obtain predictions of the severity associated with each item and the severity associated with each respondent's experiences, based on their *raw score*. If all items were found to be consistent with the assumptions of the model,<sup>4</sup> this raw score would be an integer value between 0 and 8, corresponding to the number of items they agree with (irrespective of order or which specific items).<sup>5</sup>

**Table 1.** *The eight FIES items*

N.	Short reference	Item
1	WORRIED	Since the [outbreak date], was there a time when you or others in your household worried about not having enough food to eat because of a lack of money or other resources?
2	HEALTHY	Still thinking about the time since [outbreak date], was there a time when you or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources?
3	FEWFOODS	Was there a time since [outbreak date] when you or others in your household ate only a few kinds of foods because of a lack of money or other resources?
4	SKIPPED	Was there a time since [outbreak date] when you or others in your household had to skip a meal because there was not enough money or other resources to get food?
5	ATELESS	Still thinking about the time since [outbreak date], was there a time when you or others in your household ate less than you thought you should because of a lack of money or other resources?
6	RANOUT	Was there a time since [outbreak date] when your household ran out of food because of a lack of money or other resources?
7	HUNGRY	Since [outbreak date], was there a time when you or others in your household were hungry but did not eat because there was not enough money or other resources for food?
8	WHOLEDAY	Was there a time since [outbreak date] when you or others in your household went without eating for a whole day because of a lack of money or other resources?

Having generated estimates of each item's severity, the scale these values represent is then mapped to a global reference scale<sup>6</sup> through a linear transformation equating the mean and standard deviation of the severity levels of items considered common to both scales.

<sup>4</sup> For example, where an item displays an *infit* statistics outside of the range 0.7-1.3, this would suggest that the assumption of equal discrimination of items, required for the one-parameter logistic model, does not hold. See Nord (2014) for details on the Rasch model assumptions and item fit statistics.

<sup>5</sup> The estimation of the Rasch model for the four Young Lives countries was conducted using RStudio and the RM.weights programme (Viviani, Cafiero, and Nord 2018), available from <https://CRAN.R-project.org/package=RM.weights>

<sup>6</sup> For more details of the construction of the global reference scale, see Cafiero, Viviani, and Nord (2018).

Identification of common items requires an iterative process: when an item's severity in the country-specific scale differs substantially from that of the same item on the global reference scale (after the initial transformation) the item may be considered *unique*, and the transformation repeated using the remaining *common* items. A simple excel template to perform this standardisation is provided by the Voices of the Hungry project,<sup>7</sup> alongside further information and resources related to the FIES. These resources also include a custom-made programme designed to estimate the Rasch model using RStudio software.

When the country-specific measures have been equated to the global reference scale, the probability of any individual having experienced a degree of food insecurity above a given threshold can be determined by the individual's raw score and the estimation of its associated severity. The threshold severities of the items ATELESS and WHOLEDAY on the global scale are considered to represent the cut-off points for *moderate or severe*, or *severe* food insecurity, respectively. The probability of any sampled individual surpassing one of these thresholds can be calculated as the sum of the estimated probabilities of surpassing this threshold associated with each raw score, weighted by the proportion of the sample that the raw score represents.<sup>8</sup> This summed probability represents the prevalence of this level of food insecurity in the sample overall.

### 3. The prevalence of food insecurity based on the FIES

Table 2 indicates the prevalence of *moderate or severe*, and *severe* food insecurity in the four study countries. No measures of the prevalence of food insecurity are provided for the Indian sample. Reasons for this omission are provided below.

**Table 2.** *The estimated prevalence of moderate or severe, and severe food insecurity*

Country	Prevalence of moderate or severe food insecurity			Prevalence of severe food insecurity		
	Call 2 (Aug–Oct 2020) %	Call 3 (Nov–Dec 2020) %	Change p.p.	Call 2 (Aug–Oct 2020) %	Call 3 (Nov–Dec 2020) %	Change p.p.
Ethiopia	20.2	22.4	2.2	0.5	1.4	0.9
India	n/a	n/a	n/a	n/a	n/a	n/a
Peru	28.6	25.3	-3.3	1.4	1.3	-0.1
Vietnam	4.3	5.5	1.2	0.3	0.5 <sup>a</sup>	0.2

<sup>a</sup> The relatively small sample of useable (non-extreme) observations from Vietnam in Call 3 provides a scale of item severities which is not a close match to the global scale (40 per cent correlation).

<sup>7</sup> For more details on the Voices of the Hungry project, see <http://www.fao.org/in-action/voices-of-the-hungry>

<sup>8</sup> The excel template provided by the Voices of the Hungry project allows for simple calculation of these probabilities and the sample prevalence of either *moderate or severe*, or *severe* food insecurity.

In Ethiopia, the FIES module was effectively implemented, with seven of the eight items used to estimate the scale and calibrate the estimates of food insecurity to the global scale.<sup>9</sup> The correlation of item severities between the two scales was in excess of 95 per cent in the data from both survey calls. Between the two calls, we estimate an increase in the prevalence of *moderate or severe* food insecurity (from 20.2 to 22.4 per cent), and *severe* food insecurity (from 0.5 to 1.4 per cent).

Unfortunately, it was not possible to calculate a comparable prevalence of food insecurity in the Indian sample. The conditional maximum likelihood procedure used to estimate the item severity parameters that enter the Rasch model uses only non-extreme observations, omitting those with raw scores of 0 and 8 (as these offer no information on the *relative* position of the items on the scale of severity). In both the Call 2 and Call 3 data from India, going without eating for a whole day (item 8: WHOLEDAY) was reported only by the few respondents who also indicated 'yes' to all other items (implying a raw score of 8), making it impossible to estimate the relative severity of WHOLEDAY, and thus accurately calibrate the Indian data to the global FIES scale. Subsequently, we do not report the prevalence of food insecurity for India.

As with Ethiopia, the implementation of the FIES was successful in Peru. A correlation of more than 97 per cent was achieved between the eight item severities in the global FIES and the country scale from both calls. Table 2 indicates that the Peruvian sample experienced the highest initial levels of food insecurity among the Young Lives countries (where this could be calculated). There is, however, evidence of a slight improvement between the two survey calls, with the prevalence of *moderate or severe* food insecurity falling (from 28.6 to 25.3 per cent), and *severe* food insecurity declining marginally (from 1.4 to 1.3 per cent).

While Table 2 provides estimates of the prevalence of food insecurity for both survey calls in Vietnam, it is possible that an absence of reported experiences of *any* component of food insecurity in Call 3 prevents us from estimating a globally comparable measure in this latter call. At least 80 per cent of the Vietnam sample reported no experiences of food insecurity (in both calls). In particular, only 373 of the 2,443 individuals provided non-extreme raw scores (between 1 and 7) in Call 3 (leaving a sample of only 373 on which the Rasch model could be estimated). Subsequently, the correlation between item severities from the Call 3 Vietnam data and the global scale was just 41 per cent, suggesting the estimated severities associated with the eight items in Vietnam are very different from the global reference scale. In Call 2, this correlation was 95 per cent, implying a more comparable measure.

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<sup>9</sup> The item RANOUT was not used in estimating the scales for the Ethiopia sample, as this item displayed a high value of *infit* (1.39) in the Call 3 data, indicating that the item was less consistently related to the latent measure of food security than would be expected under the assumptions of the Rasch model (Nord 2014).



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# Appendix

**Table A1.** *Measuring food insecurity during the standard Young Lives survey rounds*

	Ethiopia						India						Peru						Vietnam					
	YC			OC			YC			OC			YC			OC			YC			OC		
<b>Survey round:</b>	2	3	4	5	2	3	2	3	4	5	2	3	2	3	4	5	2	3	2	3	4	5	2	3
Has your household had any food shortages in the last 12 months?	H				H		H				H		H				H		H				H	
If food is short does anyone in your household borrow food or money for food?	H				H		H				H		H				H		H				H	
If food is short does anyone in your household forfeit meals for others?	H				H		H				H		H				H		H				H	
Who is affected by eating less preferred foods?*	H				H		H				H		H				H		H				H	
Who is affected by limiting portion sizes?*	H				H		H				H		H				H		H				H	
Who is affected by skipping meals?*	H				H		H				H		H				H		H				H	
Who is affected by not eating for a whole day?*	H				H		H				H		H				H		H				H	
Who is affected by borrowing food or money for food?*	H				H		H				H		H				H		H				H	
Who is affected by forfeiting meals for others?*	H				H		H				H		H				H		H				H	
<i>*Options: family; all adults; all children; all females; all males; adult males; adult females; adult females and boys; N/A</i>																								
Which of the following statements best describes the food situation at your home in the last 12 months?*		C	C	C		C		C	C	C		C		C	C	C		C		C	C	C		C
<i>* Options: we always eat enough of what we want; we eat enough but not always what we want; we sometimes do not eat enough; we frequently do not eat enough</i>																								

Notes: YC = Younger Cohort, OC = Older Cohort, H = Household questionnaire, C = Child questionnaire

For more information on the survey methodology and dates associated with the five in-person survey rounds, see <https://www.younglives.org.uk/household-and-child-survey>

**Table A1.** *Measuring food insecurity during the standard Young Lives survey rounds (continued)*

	Ethiopia						India						Peru						Vietnam					
	YC			OC			YC			OC			YC			OC			YC			OC		
Survey round:	2	3	4	5	2	3	2	3	4	5	2	3	2	3	4	5	2	3	2	3	4	5	2	3
<b>Questions based on the HFIAS</b>																								
In the past 12 months, did you ever worry that your household would run out of food?		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
How often did you worry that your household would run out of food?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Were you or any household member not able to eat the kinds of foods you want?	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
How often were you or any household member not able to eat the foods you want?*		C	C	C	C	C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Did you or any household member have to eat a limited variety of foods?		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
How often did you or any household member have to eat a limited variety of foods?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Did you or any household member have to eat some foods that you did not want to?		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
How often did you or any household member eat some foods that you did not want to?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Did you or any household member have to eat less (portion size) in a meal?	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
How often did you or any household member have to eat less (portion size) in a meal?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Did you or any household member have to reduce the number of meals eaten a day?	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
How often did you or any household member reduce the number of meals eaten a day?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Was there ever no food to eat in your household because of lack of money?		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
How often was there ever no food to eat in your household because of lack of money?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Did you or any household member go to sleep at night hungry because of no food? **		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
How often did you or any household member go to sleep at night hungry because there was no food?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
Did you or any household member go a whole day and night without eating anything? **	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
How often did you or any household member go a whole day and night without eating anything?*		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
** If yes, were the children in the household also affected?		C	C	C		C		C	C	C		C	C	C	C	C	C	C		C	C	C		C
* Options: rarely, one or two months in the year; sometimes, some months but not always; always or nearly always or all months																								

Notes: YC = Younger Cohort, OC = Older Cohort, H = Household questionnaire, C = Child questionnaire  
 For more information on the survey methodology and dates associated with the five in-person survey rounds, see <https://www.younglives.org.uk/household-and-child-survey>

**Table A2.** *Measuring food insecurity during the COVID-19 phone surveys*

Phone survey call:	Ethiopia			India			Peru			Vietnam		
	YC	OC		YC	OC		YC	OC		YC	OC	
	1	2	3	1	2	3	1	2	3	1	2	3
<b>Questions based on the FIES</b>												
<i>Was there a time when...</i>												
you or others in your household worried about not having enough food to eat because of a lack of money or other resources?		C	C		C	C		C	C		C	C
you or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources?		C	C		C	C		C	C		C	C
you or others in your household ate only a few kinds of foods because of a lack of money or other resources?		C	C		C	C		C	C		C	C
you or others in your household had to skip a meal because there was not enough money or other resources to get food?		C	C		C	C		C	C		C	C
you or others in your household ate less than you thought you should because of a lack of money or other resources?		C	C		C	C		C	C		C	C
your household ran out of food because of a lack of money or other resources?	C	C	C	C	C	C	C	C	C	C	C	C
you or others in your household were hungry but did not eat because there was not enough money or other resources for food?		C	C		C	C		C	C		C	C
you or others in your household went without eating for a whole day because of a lack of money or other resources?		C	C		C	C		C	C		C	C
Note: Recall period varies between calls: Call 2 (and Call 1) asks about experiences since the outbreak date; Call 3 considers a 12-month recall period.												
<i>Since the last time we talked [Call 2], was there a time when...</i>												
your household ran out of food because of a lack of money or other resources?			C			C			C			C

Notes: YC = Younger Cohort, OC = Older Cohort. For more information on the Listening to Young Lives at Work: COVID-19 phone survey, see <https://www.younglives.org.uk/research-project/young-lives-work>





An International Study of Childhood Poverty

### About Young Lives

Young Lives is an international study of childhood poverty and transitions to adulthood, following the lives of 12,000 children in four countries (Ethiopia, India, Peru and Vietnam). Young Lives is a collaborative research programme led by a team in the Department of International Development at the University of Oxford in association with research and policy partners in the four study countries.

Through researching different aspects of children's lives across time, we seek to improve policies and programmes for children and young people.

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### Young Lives Research and Policy Partners

#### Ethiopia

- *Policy Studies Institute*
- *Pankhurst Development Research and Consulting plc*

#### India (Andhra Pradesh and Telangana)

- *Centre for Economic and Social Studies, Hyderabad (CESS)*
- *Sri Padmavati Mahila Visvavidyalam (Women's University), Tirupati (SPMVV)*

#### Peru

- *Grupo de Análisis para el Desarrollo (GRADE)*
- *Instituto de Investigación Nutricional (IIN)*

#### Vietnam

- *Centre for Analysis and Forecast, Viet Nam Academy of Social Sciences (CAF-VASS)*
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