

Essentials of Clinical Nutrition in Healthcare >

## Chapter 4: Food Insecurity

Awab Ali Ibrahim; Lauren G. Fiechtner

## INTRODUCTION

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### Case Study

A 15-month-old boy with a past history of three hospitalizations for viral infections presents for evaluation of anemia. Point-of-care testing done by his primary care physician showed a Hgb of 6.7 His diet consists of human milk, minimal cow's milk, and some table foods. He stools twice per day with no blood or mucus in his stools. The patient lives with his mother and some relatives. The mother works full time in retail and is currently renting an apartment with no reported housing instability. The patient has normal vital signs, his weight is 13 kg, and his length is 75 cm. His weight for length is > 99%ile (Z = 3.78). His physical exam is otherwise normal. Lab work done is shown below.

|                             |                                     |
|-----------------------------|-------------------------------------|
| White blood cell count      | 6.6 (6.0–17.5 K/ $\mu$ L)           |
| Red blood cell count        | 4.93 (3.7–5.3 M/ $\mu$ L)           |
| Hemoglobin                  | 6.7 (10.5–13.5 g/dL)                |
| Hematocrit                  | 24.5 (33%–39%)                      |
| Mean corpuscular volume     | 59 (70–86 fL)                       |
| MCHC                        | 23 (23–31 pg)                       |
| Platelet count              | 270 (150–450 K/ $\mu$ L)            |
| Red cell distribution width | 30 (11.5%–16%)                      |
| Iron                        | 12 $\mu$ g/dL (45–169 $\mu$ g/dL)   |
| Iron saturation             | 4% (14%–50%)                        |
| Total iron binding capacity | 500 $\mu$ g/dL (230–400 $\mu$ g/dL) |
| Ferritin                    | 6 $\mu$ g/L (10–75 $\mu$ g/L)       |
| Folate                      | 13.5 ng/mL (> 4.7 ng/mL)            |
| Vitamin B12                 | 413 pg/mL (> 231 pg/ml)             |
| Stool guaiac                | Negative                            |

The patient was diagnosed with iron deficiency due to insufficient dietary intake. He was started on oral iron supplementation. A nutrition consult showed that the family would often run out of food and that the patient and parent would frequently skip meals.

**1. How can you screen this patient for food insecurity? (select all that apply)**

- A. USDA food security survey
- B. Hunger Vital Sign
- C. Ask the patient directly if they suffer from food insecurity
- D. This patient clearly does not have food insecurity, no further investigations needed

**2. What is the association between weight and food insecurity?**

**3. What federal and local resources can you refer the family to for help with access to food?**

## WHAT IS FOOD INSECURITY VS. HUNGER?

The U.S. Department of Agriculture (USDA) defines food insecurity (FI) as the lack of consistent access to enough food for an active, healthy life.<sup>1</sup>This

could be due to the unavailability of food and/or lacking the resources to access food. Hunger, in contrast, is an uncomfortable sensation or desire to consume food. FI and hunger are closely related since most people with FI will likely experience hunger; however, the concepts and terms of hunger and food insecurity should not be used interchangeably<sup>2</sup>.

## HOW COMMON IS FOOD INSECURITY?

The COVID-19 pandemic has led to a sharp increase in the prevalence of FI worldwide.<sup>3</sup> Nearly 30% of the people in the world (2.37 billion) did not have access to adequate food in 2020. Disturbingly, that is an increase of almost 320 million people in just 1 year.<sup>4</sup> With this rapid increase in food insecurity, the prevalence of malnutrition is also on the rise.<sup>4</sup> These are some statistics regarding the global burden of food insecurity: More than half of all undernourished people live in Asia (418 million), one-third in Africa (282 million and 1% of the population which is more double any other region), and a smaller portion (60 million) live in Latin America and the Caribbean.

Based on USDA data from 2020, it is estimated that the prevalence of FI in the United States is ~11% (13.8 million) of the total population.<sup>5</sup> There is a large variability in this prevalence depending on the household characteristics, with a higher prevalence of FI in ethnic under-represented groups (22% in Black non-Hispanic and 17% in Hispanic household).<sup>5</sup> Moreover, households with young children (15% have FI) and single-family households (28% of single mothers and 16% of single fathers have FI) are at higher risk of FI.

## HOW DO WE IDENTIFY FOOD INSECURITY IN THE CLINICAL PRACTICE?

FI is associated with poor health outcomes at all age groups. The American Academy of Pediatrics (AAP) and the American Association of Retired Persons (AARP) have both recommended a FI screening in both pediatric and adult healthcare visits.<sup>6,7</sup> The gold standard for assessing FI is the USDA household food insecurity module.<sup>8</sup> This is comprehensive questionnaire that consist of 18 items. The length of this questionnaire makes it difficult to administer in a clinical setting. There are various shorter assessment tools developed with similar efficacy to the USDA questionnaire. The two-item Hunger Vital Sign<sup>9</sup> is the most commonly used health screening questionnaire, with 89%–97% sensitivity and 83%–84% specificity compared to the gold standard USDA questionnaire<sup>10</sup> (Table 4-1).

TABLE 4-1

### The hunger vital sign®

| The Hunger Vital Sign®                                                                                        |                                                                                                                |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| “Within the past 12 months, we worried whether our food would run out before we got money to buy more.”       | <ul style="list-style-type: none"> <li>• Often True</li> <li>• Sometimes True</li> <li>• Never True</li> </ul> |
| “Within the past 12 months, the food we bought just didn’t last and we didn’t have enough money to get more.” | <ul style="list-style-type: none"> <li>• Often True</li> <li>• Sometimes True</li> <li>• Never True</li> </ul> |

*Note: If the answer to either or both these questions is “often true” or “sometimes true,” then the individual is at risk for food insecurity.*

## WHAT ARE THE HEALTH CONSEQUENCES OF FOOD INSECURITY?

FI is associated with lower-quality food (defined as lower fruit, vegetable, and dairy consumption) and suboptimal micronutrient content in adults unrelated to their socioeconomic status.<sup>11</sup> With children, the risk of FI and lower-quality food is not clear.<sup>11</sup> This is believed to be due to caregivers

protecting their children by prioritizing the child’s nutrition and skipping meals themselves. Analysis of National Health and Nutrition Examination Surveys (NHANES) suggests that micronutrient malnutrition is surprisingly common in the United States, with an estimated 31% of the population at risk of developing one or more micronutrient deficiencies.<sup>9</sup> Chapter 2 focuses on specific micronutrients and their deficiencies.

In the case of the 15-month-old above, the family’s FI has likely resulted in lower intake of iron-rich food such as meat, leafy green vegetables, and some fish. Iron deficiency is the most common micronutrient deficiency worldwide.<sup>10</sup> Iron deficiency anemia has multiple effects, including delays in cognitive, motor, and psychological development.<sup>12</sup>

FI has many other physical and psychological effects (Table 4-2).

TABLE 4-2

**Physical and psychological effects of food insecurity**

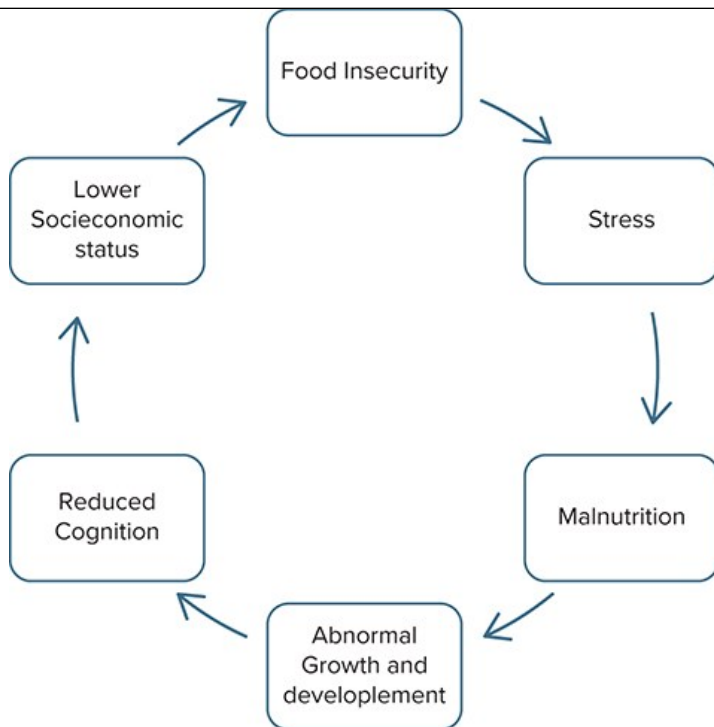
|         |                                                                                                                                                                                                                               |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Child   | <ul style="list-style-type: none"> <li>• Higher frequency of chronic illness</li> <li>• Delays in cognitive function</li> <li>• Obesity</li> <li>• Substance use</li> </ul>                                                   |
| Parents | <ul style="list-style-type: none"> <li>• Increased risk of depression</li> <li>• Substance use</li> <li>• Post-traumatic stress disorder</li> <li>• Parental Stress</li> <li>• Less responsive caregiver practices</li> </ul> |
| Adults  | <ul style="list-style-type: none"> <li>• Substance use</li> <li>• Tobacco use</li> <li>• Obesity</li> </ul>                                                                                                                   |

## WHAT ARE THE SYSTEMIC EFFECTS OF FOOD INSECURITY?

FI disproportionately affects racial and ethnic minority communities and people with lower socioeconomic status. The cause of these inequities is rooted in systemic racism and other policies including housing segregation that combine to limit access to healthy foods. Unfortunately, the physical and psychological effects of FI are interconnected and are passed down in families and generations. Figure 4-1 visualizes the vicious cycle of FI. Understanding this is crucial in the implementation of systemic and public health policies to help eradicate this problem.

FIGURE 4-1

The food insecurity cycle and how it can be passed down through generations (self-created).



Source: Beth Frates, Marie-France Hivert, Christopher P. Duggan:  
*Essentials of Clinical Nutrition in Healthcare*  
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## RELATIONSHIP BETWEEN FOOD INSECURITY AND OBESITY

Most individuals with FI live in lower socioeconomic environments. Living in these lower socioeconomic states predisposes individuals to a suboptimal diet.<sup>13</sup> With limited financial resources, individuals have to purchase high-calorie foods with lower nutrient density to stretch their budgets.<sup>14</sup> These foods are generally “more filling” and protect individuals from experiencing hunger. High-calorie foods also predispose individuals to the development of obesity.<sup>13–15</sup>

Moreover, neighborhoods with lower incomes are more likely to have limited food outlets to purchase fresh produce (food deserts) as well as an increase in fast-food restaurants (food swamps).<sup>14</sup> There is mixed evidence on the correlation between food deserts and obesity rates.<sup>15</sup> Alternatively, food swamps with increased access to unhealthy foods have been found to be a better predictor of obesity rates than food deserts.<sup>11</sup> Understanding these concepts is important in managing and preventing obesity. Weight stigma is pervasive, including from their families and medical providers and often individuals are blamed for their weight status when environmental and structural racism factors are at play.

## HOW DO WE END FOOD INSECURITY?

### Food Banks and Pantries

Feeding America is a nationwide network of 200 food banks that provides food to 60,000 food pantries and meal programs throughout the United States. A food bank is a nonprofit organization that collects and distributes food to food pantries. Food pantries are where members of the community can reach out for food assistance. Food banks rely on both state and federal funding as well as philanthropy to purchase and distribute food. Many have national nutrition standards and distribute produce, lean meat, and dairy. Many food banks help families connect with food assistance programs such as the supplemental nutrition assistance program (SNAP); they can also play a role in antihunger advocacy and policy. The national network of food banks can be found on the Feeding American website.

### Universal School Meals

The National School Lunch Program (NSLP) was established in 1946 to provide children with free or reduced-price meals. These school meals can account for over 50% of a child's calories and have also been linked to improved academic performance.<sup>12</sup> Providing meals at school can also reduce stress from families experiencing food insecurity. Unfortunately, not all children who qualify for free or reduced meals participate in this program. Cost and stigma are two of the biggest reasons for this.<sup>16</sup> Universal School Meals legislation, which has been passed in a growing number of states, ensures that all children would receive free school breakfast and lunch. The cost of this intervention is generally covered by the NSLP as well as the state.

## Hunger-Fighting Organizations

For many people who struggle with FI, getting help can be a challenge. These challenges can occur due to various reasons, such as language barriers, transportation, and fear of stigma. Hunger-fighting organizations can play a pivotal role in getting people the help they need. Connecting patients with local hunger-fighting institutions can be a helpful tool to resolve FI. For example, in Massachusetts, Project Bread is a nonprofit organization that connects people and communities to reliable sources of food while advocating for policies that make food more accessible. The food source hotline provided by Project Bread helps connect patients (through 180 languages) with the reliable food sources and federal assistance programs they need.

## Federal Food Assistance Programs

Subsidized food and food programs are one of the most effective ways to combat hunger and FI. These are funded by government programs rather than donations, making them more sustainable. [Table 4-3](#) is a list of the most common food subsidy programs.

TABLE 4-3

Food subsidiary programs available in the United States

| Program                                                   | About                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Who qualifies (varies by state)                                                                                                                                                                                   | How to apply (Hunger-fighting organization can help connect patients)                                                      |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Supplemental Nutritional Assistance Program (SNAP)</b> | <ul style="list-style-type: none"> <li>• Largest supplemental program administered by the USDA</li> <li>• Electronic Benefits Transfer (EBT) card provided <ul style="list-style-type: none"> <li>◦ Acts like a debit card</li> <li>◦ Benefits loaded on card each month</li> </ul> </li> <li>• EBT card can be used to buy food and drinks (not alcohol) as well as seeds and food producing plants</li> <li>• Cannot be used for ready-made meals</li> </ul> | <ul style="list-style-type: none"> <li>• Gross income below 130% of poverty limit</li> <li>• Net income below 100% of poverty limit</li> </ul>                                                                    | <ul style="list-style-type: none"> <li>• SNAP local office, which can be located on the USDA website for SNAP</li> </ul>   |
| <b>Woman, Infants, and Children (WIC)</b>                 | <ul style="list-style-type: none"> <li>• Provided by the USDA</li> <li>• Provides nutritional needs for woman and children</li> <li>• Some states might offer food lists or a phone app detailing foods that are available through the program</li> </ul>                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Pregnant woman</li> <li>• Woman up to 6 months postpartum</li> <li>• Breastfeeding mothers up to infants first birthday</li> <li>• Children under 5 years old</li> </ul> | <ul style="list-style-type: none"> <li>• Local WIC office, which can be located on the USDA website for WIC</li> </ul>     |
| <b>Senior Farmers Assistance Program (SFMNP)</b>          | <ul style="list-style-type: none"> <li>• Provided by USDA</li> <li>• Low-income seniors receive coupons that can be used in participating locations</li> <li>• Benefits from \$20–50 annually</li> </ul>                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Seniors over 60</li> <li>• Income less than 180% of poverty limit</li> </ul>                                                                                             | <ul style="list-style-type: none"> <li>• Local SFMNP office, which can be located on the USDA website for SFMNP</li> </ul> |
| <b>Commodity Supplemental Food Program (CSFP)</b>         | <ul style="list-style-type: none"> <li>• USDA program</li> <li>• Low-income seniors receive monthly food packages</li> </ul>                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Seniors over 60</li> <li>• Income less than 130% of poverty limit</li> </ul>                                                                                             | <ul style="list-style-type: none"> <li>• Local CSFP office, which can be located on the USDA website for CSFP</li> </ul>   |

### Three Take-Home Points

1. Food insecurity is highly prevalent and should be considered in all clinical encounters.
2. The Hunger Vital Sign is a quick and efficient way of screening for food insecurity during clinical visits.
3. Patients who screen positive for food insecurity should be enrolled and referred to federal and other charitable food assistance programs.

### Case Study Answers

1. **A, B;** The gold standard for screening food insecurity is the USDA food security survey tool; however, this is time intensive and difficult to implement during clinic visits. The Hunger Vital Sign® is a two-question questionnaire that screens for FI with good sensitivity and specificity.
2. Patients with FI are at an increased risk of developing obesity. FI patients often need to prioritize the purchase of high-calorie food with lower nutrient density to help stretch their budget and relieve hunger. Moreover, many people with FI will live in “food swamps,” which have been linked to obesity.
3. The patient and his mother likely qualify for both WIC and SNAP based on the criteria in [Table 4-1](#). To help patients sign up for these programs, you can refer them to hunger-fighting organizations or local social services that can connect them with appropriate resources. Referring the patient to a food bank can also be helpful to get immediate access to food. Food banks can also help connect patients with supplemental nutrition programs.

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