

Developing and Piloting a Tool to Identify Food Insecurity in Older Adults

Alexandra King, MD, Regina Roofeh, MPH, Christian Nouryan, MA, Meng Zhang, PhD, and Maria Torroella Carney, MD

Objective: The literature shows that food insecurity (FI) can negatively affect the trajectory of many chronic illnesses. FI can be acutely severe for older adults, but screening for FI is not regularly performed in the hospital setting. Our goal was to develop a tool to screen for FI upon hospital discharge to identify patients who may require community food resources. This is the first attempt to build such a tool for implementation in our health system.

Methods: In two university hospitals and one community hospital, patients 65 years old and older were admitted to the Internal Medicine service who would approach discharge within 2 days. We screened patients meeting our criteria using an FI tool (FIT), which addressed patterns associated with FI. All of the patients screened were offered a list of community resources.

Results: Of the patients recruited, 69 met the study criteria. The majority of patients screened displayed some FI, with 56% having ≥ 3 food insecurities. Statistically significant relationships were established for individual FIT questions with age, admission albumin level, body mass index, length of stay, and median household income based on ZIP code.

Conclusions: Use of the FIT can help identify vulnerable patients and connect them to food resources. The FIT was easy to use, well tolerated, and time-efficient, leaving it poised for use in the busy environment of inpatient services.

Key Words: discharge, food insecurity, older adult, screening

Food insecurity (FI) is the state of having insufficient access to adequate amounts of nutritious food and can exist with or without the additional presence of physiologic hunger, because food options may be limited to less-expensive, calorie-dense

foods.^{1,2} It is known that FI is associated with poor physical and mental health status and that it negatively affects the trajectory of many chronic illnesses, including type 2 diabetes mellitus and hypertension, potentially as a result of intake of a poor-quality diet.²⁻⁵ FI also has been linked in the last decade to cost-related medication underuse, a significant cause for medication nonadherence among patients.^{4,6} Ultimately, the relation between FI and health is complex and often reciprocal in nature: FI can promote poor health, and poor health can in turn worsen FI, leading to increased healthcare utilization.⁷ Because of this reciprocal relation, often it is difficult to determine the origin point of FI for an individual.

Older adults, defined as individuals 65 years or older, are a large and growing segment of the US population, accounting for approximately 15% of the total population.⁸ This proportion of the population is in the midst of a considerable growth curve, which is expected to reach >20% of the US population by 2030, up from 13% in 2010.⁹ According to the US Department of Agriculture, 8.9% of households with older adults experience FI, 3.2% of which had “very low” food security, meaning that the food intake of one or more members of the household was reduced and eating patterns were disrupted as a result of insufficient money and other resources for food.⁸

Previous studies have been performed in regard to the ideal route to provide aid to individuals with FI.^{3,10,11} In the United States, 1 in 7, or 46 million individuals, rely on food pantries and meal service programs to feed themselves.¹² Food banks are an imperfect solution because they only delay rather than solve FI, although they can provide an important bridge for those recovering from illness.¹³ In addition, having access to nutritious foods in the home does not necessarily mean that individuals, particularly older adults, will be able to use this food in meal preparation, given their limitations.⁸

From Northwell Health, Lake Success, New York.

Correspondence to Ms Regina Roofeh, Long Island Jewish Medical Center, 270-05 76th Ave, Research Bldg, New Hyde Park, NY 11040. E-mail: rroofeh@northwell.edu. To purchase larger reprint quantities, please contact Reprintsolutions@wolterskluwer.com.

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Key Points

- The majority of admitted older adults screened faced some form of food insecurity (FI).
- Inpatient admission is an opportunity to screen older adults for FI and connect them to community resources.
- The use of a short FI tool is a well-tolerated and effective means of identifying older adults with FI.

Researchers have found that when money was constrained, older adults often turned to their social network for support via food sharing and congregate dining, which allowed them to partake in affordable meals in a social setting.¹⁰ Past interventions encompassing both food supplementation and connection to community resources have successfully affected FI over time.¹¹ It is clear that a strong social support network is important. Those without such support, such as “elder orphans” (those aging alone) may have a more difficult time.¹⁴

Identification and management of FI in vulnerable patient populations, particularly the older adult population, are important to ensure overall good physical and mental health status. Hospitalization often represents a challenging experience for older adults because they may face declines in physical function and nutritional status.¹⁵ The posthospital discharge period is critical to illness recovery and re-entry into the community for these patients, and poor dietary intake during this period has serious implications for compliance with prescribed medications and thus medical management of disease.^{2,16–18} Studies have shown that the reduction of FI is linked with a simultaneous perceived improvement in physical and mental health.^{19,20}

Despite its potential to affect health status, routine screening for FI is not performed in the healthcare setting, and reliable identification of food-insecure patients has remained challenging because no validated tool exists to screen for FI. Our goal was to develop a tool to screen for FI upon hospital discharge. The purpose of the tool was to identify patients at risk for FI resulting from restrictions related to transportation, food preparation, and functional ability, in addition to those with financial restrictions. Upon identification, these patients were provided with available resources in their community that can assist with food availability and associated limitations related to FI.

FI is a significant public health concern, particularly in vulnerable patient populations such as older adults. The postdischarge period represents a time of particular susceptibility for FI, given the changes in dietary intake during hospitalization and the potential declines in function secondary to illness(es) that may affect access to food.

Methods

A literature review was performed to identify previous studies concerned with FI, and a list of hallmark patterns and behaviors was generated and used to create an FI tool (FIT) containing nine questions pertinent to FI. These questions looked to address the presence, severity, and etiology of FI in each patient. The tool is scored on a binary of “1” or “0” for each question, with a total minimum score of 0 and a maximum score of 9, and higher scores indicating higher levels of FI (Table 1).

The tool was then piloted in three inpatient locations: two university hospitals and one community hospital. The inclusion criteria included patients aged 65 years and older, admitted to the Internal Medicine service and approaching discharge to the community within 2 days. The exclusion criteria included patients with dysphagia, presence of a percutaneous endoscopic gastrostomy

Table 1. Question categories and scoring system for the FIT

Question category	Scoring	
Caregiving availability	1, no	0, yes
Food availability upon return home	1, no	0, yes
Physical ability to prepare food	1, no	0, yes
Money to buy food	1, no	0, yes
Shopping transportation	1, no	0, yes
Physical ability to shop for food	1, no	0, yes
Respondent expectation of life changes	1, worsen	0, improve or no change
Food delivery or assistance program	1, yes	0, no
More information for food assistance	1, yes	0, no

The total score is tabulated for use as assessment. FIT, food insecurity tool.

tube or other device to assist nutrition, patients receiving total parenteral nutrition, nonverbal patients, patients who do not speak either English or Spanish, and patients who declined participation. Patients who were to be discharged to a rehabilitation facility before returning home were screened for FI in anticipation of their return home, not for their rehabilitation stay. A medical student administered the FIT after an explanation of the study was given and verbal consent to proceed was obtained. All of the patients approached were assured that participation was optional and refusal to participate would not affect their care. The time needed to administer the FIT itself is roughly 5 minutes, although the overall time spent for each patient encounter varied, because administration of the FIT often sparked additional conversation regarding food security upon discharge. These conversations were encouraged and useful to the clinical staff as a window into the patients' lives in the community.

Regardless of their score using the FIT, all of the patients who were screened were offered a resource list that was developed by a multidisciplinary team to be representative of the resources available in the region. This list included services that affect both direct and indirect causes of FI, including a partner food bank that enrolls individuals in the Supplemental Nutrition Assistance Program (SNAP) benefits, local grocery and meal delivery, transportation, local offices for older adult benefits, and services that provide assistance for individuals with functional limitations.

Demographic information and data points potentially relevant to nutritional status, including serum albumin and body mass index (BMI), were collected and maintained in a secure, Health Insurance Portability and Accountability Act–compliant database. The study was reviewed by the facility institutional review board and deemed to be a quality-improvement initiative. Results were analyzed using SAS version 9.4 (SAS Institute, Cary, NC).

Patient characteristics included age, sex, insurance (Medicaid, Medicare, Dual Eligible, and Managed Medicare), BMI (underweight [<18.5], normal weight [$18.5–24.9$], overweight [$25.0–29.9$], obese [$30.0–39.9$], extremely obese [≥ 40]), length of stay (LOS), albumin level, and median household income based on ZIP code.

The total FI score was equal to the total number of food insecurities a patient had based on the nine questions (range 0–9) of the FIT. The χ^2 or the Fisher exact test was used to determine any associations among categorical patient characteristics (sex, insurance, and BMI), the patient's FIT total score (<4 vs \geq 4), and patient responses (yes or no) to specific questions of the FIT. The two-sample *t* test and the nonparametric Wilcoxon test were used to compare the mean/median of continuous patient characteristics (age, BMI, LOS, albumin, and median household income) to a patient's FIT total score (<4 vs \geq 4) and patient responses (yes or no) to individual questions of the FIT.

Results

A total of 69 patients met the criteria and were screened during March 2017 in three hospital settings. All of the patients who were approached agreed to take the survey. Fifty-eight respondents were in a university hospital setting and 11 respondents were in a local community hospital. As indicated in Table 2, the average age of the patients was 80.5 years (range 65–96). The sample consisted of 37 (54%) women and 32 (46%) men. The average BMI was 27.6 (range 16.6–55.4) and the average albumin level at the end of hospital stay was 3.2 g/dL (range 1.7–4.7 g/dL). The mean hospital LOS was 7.3 days (range 2–28 days). The average median household income, based on ZIP code, was \$81,041 (range \$39,409–\$153,438); however, the actual income for those aged 65 years and older is generally lower than average. This median income is higher than the national median of \$60,336 but lower than the county median income of \$105,744.^{21,22} Associated with this higher median income is a higher cost of living for the county, as compared with the state overall.²³

More than half of the subjects (56%) had \geq 3 food insecurities, as defined by the survey results, whereas 33% had \geq 4.

Subjects with \geq 4 food insecurities were associated with a longer mean LOS (9.70 days [standard deviation {SD} 7.31] vs 6.09 days [SD 4.67], $P = 0.01$) compared with those with <4 food insecurities. Although most (96%) could prepare their own meals or had someone who made sure that food was available to them, 38% did not have 3 days of food at their home. A total of 77% reported being physically able to prepare their own meals or obtain prepared meals. Patients without the ability to prepare their meals or without someone to help with food were associated with lower mean albumin levels (2.43 vs 3.19 g/dL, $P = 0.04$). Patients without enough food or access to food for the next 3 days were associated with lower mean yearly salary based on ZIP code (\$73,707 vs \$85,476, $P = 0.02$) compared with those with enough food in their homes or access to food. Patients without the ability to prepare or obtain meals were associated with lower mean yearly salary (\$67,837 vs \$85,027, $P = 0.01$) compared with those who could prepare or obtain their meals. Only one subject reported not having money available to buy food. No association was found between patient responses to this question and patient characteristics.

Traveling to or ordering a delivery from a grocery store was not possible for almost half (49%) of respondents. Patients without this ability were associated with lower mean BMIs (25.87 vs 29.17, $P = 0.03$) and longer mean LOSs (8.47 vs 6.14 days, $P = 0.01$) in the hospital. Among the respondents who could travel to a food store, 68% reported they were able to perform all of the activities involved in shopping for food, including walking, bending, and reaching. Patients who could not perform all of these activities were associated with a lower mean BMI (24.93 vs 28.80, $P = 0.04$). The majority (81%) responded that they expected that their ability to obtain food or meals would remain the same during the next 6 months. No association was found between patient responses to this question and patient characteristics.

Table 2. Total FI score (<4 and \geq 4) vs demographics

Characteristic	Total	<4	\geq 4	<i>P</i>
No. patients (%)	69 (100)	46 (67)	23 (33)	
Mean age, y (SD)	80.5 (\pm 8.8)	80.4 (\pm 9.1)	80.8 (\pm 8.4)	0.84
Sex, n (%)				0.39
Male	32 (46)	23 (50)	9 (39)	
Female	37 (54)	23 (50)	14 (61)	
Insurance, n (%)				0.57
Medicaid	3 (4)	3 (7)	0 (0)	
Medicare	31 (45)	21 (46)	10 (44)	
Medicaid and private insurance	24 (35)	16 (35)	8 (35)	
Medicaid and Medicare	11 (16)	6 (13)	5 (22)	
BMI, mean (SD)	27.6 (\pm 7.1)	28.3 (\pm 7.2)	26.1 (\pm 6.6)	0.17
LOS, d, mean (SD)	7.3 (\pm 5.89)	6.1 (\pm 4.67)	9.7 (\pm 7.31)	0.01 ^a
Albumin, mean (SD)	3.16 (\pm 0.64)	3.25 (\pm 0.69)	2.97 (\pm 0.48)	0.09
Median income, US\$, mean (SD)	\$81,041 (\pm \$24,676)	\$83,440 (\pm \$23,847)	\$76,242 (\pm \$26,129)	0.21

BMI, body mass index; FI, food insecurity; LOS, length of stay; SD, standard deviation.

^aSignificance to $P < 0.05$.

Although only 35% of patients responded that they would benefit from a food delivery or food assistance program, 59% wanted more information, although no association was found between patient responses to this question and patient characteristics. Patients who did not believe that they would benefit from food delivery resources were younger (79.02 years old vs 83.33, $P = 0.04$) than those who believed they would benefit from food delivery resources.

Discussion

The literature lacks information regarding the use of a tool to assess FI for older adults in the inpatient setting. There is an increasing potential and a need for further studies on how best to assess this social determinant as the population of older adults grows.

It was found that the majority of patients screened displayed some level of FI. This represents a significant problem for both safe discharge from a healthcare facility, recovery from illness, and long-term health.^{24,25} The patients studied were most likely to report difficulty with transportation to and from the grocery store and were least likely to report financial restrictions; only one patient disclosed trouble with money and/or other resources (including SNAP) for purchasing food. Transportation was a commonly reported barrier for a variety of reasons, including lack of social support, seasonal changes, limited neighborhood walkability, and inability to drive or use of public transit often due to functional impairments. Greater than 80% indicated difficulty with shopping and approximately 45% reported an inability to cook meals with fresh ingredients even once they were in their home, echoing previous studies.^{10,16}

Although the median income in our study is higher than the national median, it is lower than the median for our county. This disparity, coupled with the high cost of living in the county, may leave many older adults in the county with financial restrictions as a factor in food security. Our results reflect national trends with regard to financial constraints, wherein only one in three SNAP-eligible older adults uses these benefits, which may be attributed somewhat to stigma in using the program and a lack of education regarding eligibility.¹⁰ This highlights a potential gap in communication between the community and its constituents regarding the presence of these programs. Patients were enthusiastic about the prospect of receiving a list of resources, regardless of the level of need indicated via their FI score. This supports our supposition that functional ability and limitations strongly contribute to the presence of FI in addition to financial constraints. Our hope is that by increasing awareness among patients and caregivers, vulnerable populations can be connected to these needed resources.

Although valuable, this study did contain limitations. First, the researchers found that at times it was difficult to establish the bond necessary to allow the disclosure of private information (eg, financial status) in the time that it took to complete the patient encounter. In the future, it may be more beneficial for a healthcare worker who already has a relationship with the patient to administer the FIT, such as a social worker or the patient's primary care team in the hospital. This may allow for a fuller discussion of the patient's needs before discharge. In addition, including a question

with a point for "subjective impression" of the interviewer in regard to the status of the patient based on general impression, including appearance, weight, or overall health, may help to understand the overall gestalt of a patient's well-being. Further studies assessing the rigor of the scoring formula are warranted. The small sample size in this study also has limited the number of conclusions that can be made regarding FI, and a wider study should be implemented to further explore the trends established here. In future studies, the inclusion criteria and potential factors associated with FI will be addressed to determine additional relationships. These categories, including number and type of medications and marital status and caregiver availability, may provide a more comprehensive view of individuals with FI. Study of the FIT in alternative populations, including patients being discharged to nursing and long-term care facilities, also is warranted.

The next steps for the FIT will be to establish a protocol in which a social worker is notified about any patient who scores ≥ 3 FI risk points when screened to ensure he or she receives assistance before discharge. This protocol may include triggering appropriate linkage to home care or home health aide referrals, ensuring proper outpatient follow-up to evaluate further treatment plans, and identifying and supporting caregivers. Finally, it is understood that a resource list is far from a complete solution to the FI problem. Although such a list makes strides toward connecting patients to resources, it would be ideal for resources to be located closer to the hospital itself.

Future directions may include the implementation of a "food pharmacy" adjacent to the hospital, in which patients with "prescriptions" can receive a few days of healthy food to take home after a positive screening for FI. In addition, longer-term interventions may involve follow-up via telephone with patients with FI to connect them with community and federal resources such as SNAP benefits; poorly supported older adults often find these difficult to apply for, given their own limitations. Poor communication between medical and community-based healthcare systems often makes it difficult to connect hospital-discharged adults with the resources that they need to recover and maintain good health. As such, many vulnerable, homebound older adults must rely on themselves and on others for nourishment.¹⁶ Routine screening to combat FI is not being performed in healthcare settings because the reliable identification of these patients is challenging.

The present study has found that the use of a simple tool to screen patients upon discharge can help healthcare workers to identify vulnerable patients and connect them to community resources. The FIT was easy to use, well tolerated, and time efficient, leaving it poised for use in the busy environment of inpatient services. Its use, paired with the identification of community resources and the future implementation of both short- and long-term solutions, will help us to combat the significant problem of FI in this country.

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