

Food Insecurity

It Is More Common Than You Think, Recognizing It Can Improve the Care You Give

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In this article, we present a case from our Interprofessional Diabetes Clinic to describe assessment and impact of food insecurity on a patient's overall health and how the health-care providers' recognition of food insecurity changed the management of a patient with type 2 diabetes mellitus, obesity, and depression. This approach to treating patients with food insecurity may also apply to individuals with diabetes who regularly skip meals; are inconsistent with their carbohydrate intake, for whatever reason; or routinely engage in fasting. Healthcare professionals should screen all patients for food insecurity, educate patients to use appropriate coping strategies, adjust medications to minimize adverse effects, recognize that food insecurity is cyclical for most, connect patients with community resources, and advocate for services in clinics and hospitals. *Nutr Today*. 2017;52(5):248–257

Clinicians need to understand that FI can be cyclical and episodic.

This case from our Interprofessional Diabetes Clinic highlights how the recognition from a family physician of FI changed the management of a patient with type 2 diabetes mellitus (T2DM), obesity, and depression. This approach to treating patients with FI may also apply to individuals with diabetes who regularly skip meals; are inconsistent with their carbohydrate intake, for whatever reason; or routinely engage in fasting.

Statistics on Food Insecurity (FI)

In 2015, an estimated 12.7% or 15.8 million households were food insecure.^{6,7} Although it declined significantly from a high of 14.9% in 2011, it was still higher than the 2007 prerecessionary level of 11.1%. Five percent of US households (6.3 million households) had very low food security, whereas children were food insecure at times during the year in 7.8% of US households (3.0 million households). The rates of FI were substantially higher than the national average for households with incomes near or less than the federal poverty line, households with children headed by single women or single men or black and Hispanic adults, and women and men living alone. The prevalence of FI varied considerably from state to state ranging from 8.5% to 20.8%. Figure 1 depicts the average rates of FI across the country.⁷

Impact on Health

Households with FI are more likely to have adults with chronic illnesses such as diabetes, heart disease, hypertension, stroke, pulmonary disease and cancer, emotional distress (especially depression), and nutrient deficiencies.^{8,9} In addition, FI with diabetes leads toward increased medication nonadherence and diabetes distress, more food–medicine–medical supplies trade-offs, decreased diabetes self-efficacy, and other self-management challenges. The impact of FI on management of chronic disease is depicted in Figure 2.¹⁰ In a safety-net clinical setting, FI was found to be an independent predictor of glycemic control. This was explained in part by difficulty in following a diabetic diet and emotional distress related to diabetes.¹¹

Food insecurity (FI) is a critical social issue that requires the attention of not only policy- and decision-makers but also healthcare professionals.^{1,2} Table 1 provides widely accepted definitions from the US Department of Agriculture.³ Compromised dietary patterns and highly energy-dense, low–nutrient-density foods are correlated with FI and overweight, obesity, and chronic diseases.⁴ Clinicians need to understand that FI can be cyclical and episodic and affect even middle-income families at times.⁵ Thus, regular screening is required to identify patients with FI.

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TABLE 1 Definitions of Food Security and Food Insecurity³

“Food security”	Access by all people at all times to enough food for an active, healthy life.
“Food insecurity”	Household-level economic and social condition of limited or uncertain access to adequate food.
“Low food security”	Formerly called “food insecurity without hunger”; reduced quality, variety, or desirability of diet but with little or no reduction of food intake.
“Very low food security”	Formerly known as “food insecurity with hunger”; multiple indications of disrupted eating patterns and reduced food intake

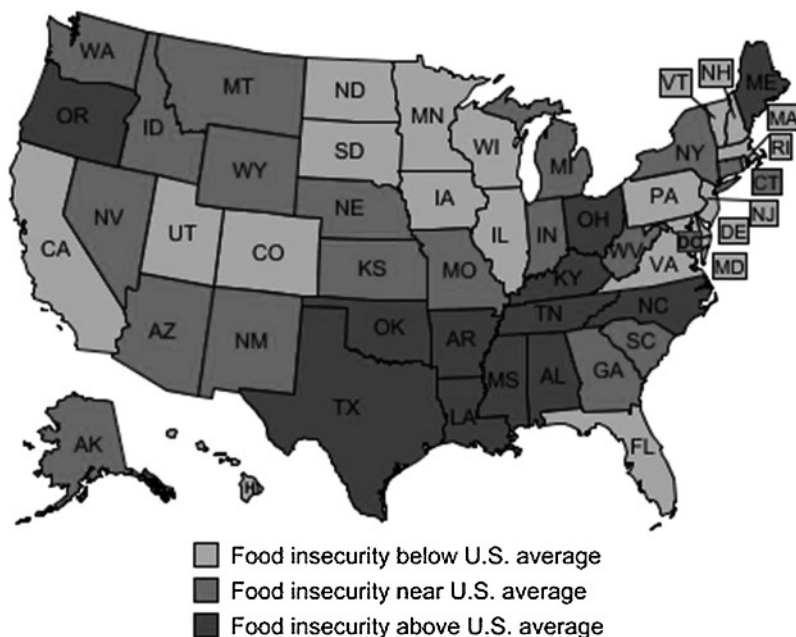
surveys are more appropriate for the clinical environment and can be easily inserted into the electronic health record (EHR) to be used during history taking.¹³ The Academy of Nutrition and Dietetics suggests that dietetic professionals screen patients using a single-item food sufficiency question, “Which of the following statements best describes the food eaten in your household: (1) enough of the kinds of food we want to eat; (2) enough but not always the kinds of food we want to eat; (3) sometimes not enough to eat; or (4) often not enough to eat.”² Kleinman and coworkers¹⁴ offer the following question that has 83% sensitivity and 80% specificity when compared with the 18-item US Department of Agriculture tool¹: “In the past month, was there any day when you or anyone in your family went hungry because you did not have enough money for food?” Young and coworkers¹⁵ offered a 2-question survey with 100% sensitivity and 78% specificity when both questions were answered in the affirmative: (1) “The food I/we bought just didn’t last, and I/we didn’t have money to get more.” and (2) “I/we couldn’t afford to eat balanced meals.” Hager and coworkers¹⁶ found an affirmative answer to either of the following questions that provided 97% sensitivity and 83% specificity: (1) “Within the past 12 months we worried whether our food would run out before we got money to buy more” and (2) “Within the past 12 months the food we bought just didn’t last and we

These researchers found that adults with FI are unable to meet their caloric needs and thus weight loss occurs. When the FI was less severe, adults with FI meet their caloric needs by shifting dietary intake toward less expensive foods.

Screening for FI

The criterion standard screening tool for FI is the US Household Food Security 18-Item Survey.¹² Several shorter

Prevalence of food insecurity, average 2013-15



Source: Calculated by ERS, USDA, using data from the December 2013, 2014, and 2015 Current Population Survey Food Security Supplements.

FIGURE 1. Map of food insecurity in the United States.

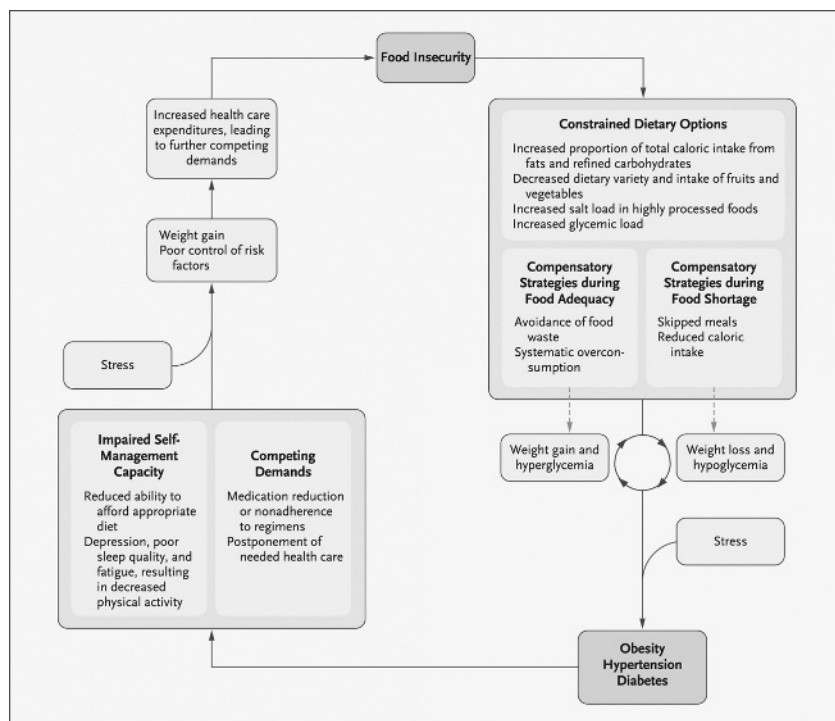


FIGURE 2. The cycle of food insecurity and chronic disease flowchart. Reprinted with permission from Massachusetts Medical Society.

didn't have money to get more." To remove clinician bias and normalize the situation, so that nobody is singled out, all patients should be screened. In a report from Kaiser Permanente Colorado,⁵ 14% of those with jobs with health benefits unexpectedly screened positive for FI. The authors stated, "If you don't ask the right questions, this foundational need related to food access would go unnoticed."

CASE PRESENTATION

Mrs KG, a 32-year-old woman, was referred to the East Carolina University Family Medicine Diabetes Inter-professional Clinic. She was told that she would receive care from a family physician with fellowship training in diabetes and metabolism (MD), a registered dietitian nutritionist (RDN)/Certified Diabetes Educator, a clinical pharmacist practitioner (CPP/PharmD), and a Behavioral Health Consultant (BHC). A CPP is a pharmacist who is licensed under a collaborate physician agreement to provide drug therapy management. The appointment would last between 1 and 2 hours. She was asked to bring her blood glucose log, glucometer and supplies, all medications, and a food log for at least 7 days. Each member of the team would work with her individually, and the appointment would end with the MD reviewing and approving the plan developed by the whole team. She would be followed by the team for her diabetes care until a complete plan was established and her glycemic control was improved or at goal. Follow-up visits lasting 30 to

60 minutes would be scheduled for 2 to 6 weeks later, depending on the plan. This plan would be shared with her primary care physician (PCP) who would still follow her for her standard medical care. Her diabetes care would eventually be returned to her PCP as well.

Diabetes History

The following medical history was gathered by the team both from the EHR and by patient interview. At the age of 23 years, Mrs KG developed gestational diabetes during her third pregnancy, and with the assistance of an RDN, she made lifestyle modifications that provided diabetes control without medication. Even so, she gained 50 lb with the pregnancy. She was diagnosed with T2DM a few months after her delivery and was started on metformin (500 mg daily with breakfast) and, for the next 6 months, was slowly increased to 1000 mg twice a day with meals as tolerated. She had agreed to check her blood glucose 1 to 2 times a week at random times and stated that the results, on average, were approximately 200 mg/dL. Her hemoglobin A1C (A1C) goal was less than 7% but was measured at 8.4% at a clinic visit with a PCP. She declined another session with the RDN because she felt comfortable with her knowledge of diet and diabetes and believed that Medicaid would not pay for the visit. Her PCP added a sulfonylurea (Glimepiride, 2 mg daily) to her regimen.

For the next 5 years, she was seen by her PCP 1 to 2 times a year, reporting occasional episodes of fatigue, shaking,

and sweating, sometimes affecting her sleep. She was diagnosed with depression and was prescribed a tetracyclic antidepressant, mirtazapine, for depression and sleep. Her A1C remained higher than 8% so her metformin was continued and Glimepiride dose was increased to 4 mg daily. She refused to add a third medication for diabetes. She stayed on this regimen gaining 30 lb.

At an emergency room visit a year ago, she was diagnosed with urinary tract infection, her blood sugar was higher than 400 mg/dL, and her A1C was 11.4%. In follow-up with her PCP, she agreed, hesitantly, to start insulin. Mrs KG refused the multiple daily injections/basal-bolus insulin regimen suggested by the PCP. She also was worried about checking blood sugars and taking injections 4 times a day. She was concerned about the costs of insulin and blood glucose testing supplies. The PCP discontinued her oral agents (metformin and Glimepiride) and started her on premixed 70/30 insulin (insulin isophane and insulin regular), which required only 2 injections per day and was less expensive. The PCP recommended a visit with an RDN, but Mrs KG again declined. For the next 3 months, she randomly checked her blood sugar averaging greater than 250 mg/dL. At her clinic visit, her A1C was 11% and random blood sugar was greater than 300 mg/dL. The PCP increased her insulin dosage. Three months later in clinic, her A1C was 7.8%, but she complained of frequent episodes of shaking, sweating, and fatigue, usually in the afternoon and after midnight. She reported feeling better if she immediately ate “nabs”—peanut butter crackers—or drank sweet tea or regular soda. If she checked her blood sugar a few minutes after, it was usually greater than 200. She gained 10 additional lb after starting insulin. She agreed with her PCP to see the diabetes consult team and keep food and blood sugar logs in advance of the visit.

Visit 1 With Diabetes Interprofessional Consult Team

Mrs KG was 5'11" tall and weighed 460 lb (body mass index, 64 kg/m²), and her waist circumference was 55 in. Her A1C was 7.8%, and her blood pressure was 130/80. In addition to the history mentioned previously, she reported hypertension, depression, insomnia, and chronic bilateral knee pain due to mild osteoarthritis. She has no allergies. Her medications included premixed 70/30 insulin for T2DM, a calcium channel blocker, amlodipine for hypertension, mirtazapine for depression and insomnia, and over-the-counter acetaminophen as needed for knee pain. She does not smoke or chew tobacco or use e-cigarettes, drink alcohol, or use illicit drugs. She is married and lives in an apartment with her husband and 3 school-age children and is not employed outside home. Her husband is an hourly wage farm worker. She has medical insurance coverage through Medicaid and receives Supplemental Nutrition Assistance Program (SNAP, formerly known as

food stamps) benefits. She screened positive for FI. She provided both blood sugar and food logs as requested (Table 2).

Individual MD Visit

The MD met with the patient first to confirm and obtain a further history and perform physical examination including screening for diabetes complications. Mrs KG had no known macrovascular complications of diabetes (eg, coronary artery disease, stroke/transient ischemic attack, or peripheral arterial disease). She was found to have decreased sensations to a screening 5.07-size monofilament and vibration but no calluses, deformities, ulcers, or amputations on both feet. She had microalbuminuria on the point-of-care screening urine test during this visit. She did not report any history of retinopathy but had not seen an eye doctor for a comprehensive eye examination for the past 4 years. She reported frequent blurry vision, especially when her blood sugars were high. Because of reported recurrent symptoms of shaking, sweating, and fatigue and her FI, the MD was concerned about hypoglycemia from premixed insulin and carbohydrate mismatch. Additional information about avoiding hypoglycemia is presented later in this article.

Individual Visit With RDN-CDE

The RDN reviewed Mrs KG's food log and found that she frequently skipped meals, especially lunch, and consumed large portions at times and showed other signs of FI coping behaviors. She is typically alone during the day while her husband is at work and their children are at school. The RDN discussed the FI survey results, which found that, within the past 12 months, she worried whether the family food would run out before they got money to buy more. She also responded yes to statement that, within the past 12 months, the food she bought just did not last and they did not have money to get more. The RDN encouraged her to talk freely about the families' access to food. The SNAP or food stamp benefit for the entire family was \$68 per month. She stated that she pretended “not to be hungry” at the end of the month so there was more for the children to eat and also binged at the beginning of the month when she received SNAP. She shared that, when food was low, her brother-in-law would send over a couple of pizzas and a 2-L bottle of regular soda for dinner. She also shared that her sister bought whatever the 2-for-1 breakfast special the fast-food restaurant had and gave her one. Mrs KG explained, “When someone gives you free food you don't ask for something different, you just take it.” Helping Mrs KG stretch food dollars is a key strategy in her treatment. Information on coping strategies used by food-insecure individuals is presented later in this article.

The RDN provided education about recognizing and treating symptoms of hypoglycemia. The patient said that she

TABLE 2 Mrs KG's Food Log and Observations by the Diabetes Team

	April 3	April 10	April 21	April 25	April 30
Breakfast	3 scrambled eggs with cheese, 5 strips of bacon, 2 cups of grits, 2 biscuits, 20 oz of orange juice	3 scrambled eggs with cheese, 5 strips of bacon, 2 cups of grits, 2 biscuits, 20 oz of orange juice	1 sausage, egg, and cheese biscuit from drive-thru, 1 large coke	1 sausage, egg, and cheese biscuit from drive-thru, 1 large coke	Skipped
Lunch	Bologna sandwich, half package of Oreos, half large bag of Doritos, diet soda	2 bologna and cheese sandwiches, 8 chocolate chip cookies	1 box macaroni and cheese, water	Skipped	Skipped
Dinner	2 pieces of baked chicken, mashed potatoes with gravy, broccoli with cheese sauce, 2 glasses of diet soda	5 pork spareribs, 2 cups of collard greens, 4 corn muffins, 2 glasses of diet soda	4 pieces of fried chicken and 1 cup of French fries from local fast-food restaurant, Kool-Aid	6 slices of cheese pizza delivered to home, 2 glasses of Kool-Aid	1 package of ramen noodles, water
Bedtime snack	Half package of Oreos and a glass of 2% milk	None	None	1 slice of leftover pizza	None
Observations by the diabetes team	Binge eating in the first half of the month causing hyperglycemia and weight gain	Binge eating in the first half of the month causing hyperglycemia and weight gain	Inconsistent carbohydrate intake leading to insulin and carbohydrate mismatch resulting in hyperglycemia/hypoglycemia	Skipped a meal because of limited food availability in the second half of the month leading to hypoglycemia	Skipped meals because of lack of food by the end of the month, caused hypoglycemia from insulin

understood that her fatigue, shaking, and sweating were most likely from hypoglycemia resulting from a carbohydrate and insulin mismatch. People with consistent intake of carbohydrate-containing foods have less hypoglycemia risk than those with irregular eating habits. Patients who have limited options at the end of the month may struggle with hypoglycemia and hyperglycemia. The RDN and Mrs KG agreed that she would focus on being consistent with her carbohydrate intake and match its intake to the medication. They agreed to create a more detailed diet plan at another visit.

At this visit, the RDN referred her to community resources including the local food bank, free and reduced school breakfast and lunch programs, and the backpack buddy weekend food program for her children. Assuring Mrs KG understands accessing resources that provide food for her children such as school breakfast and lunch programs is a strategy to stretch the family food dollar significantly. The clinic maintains a list of community resources in its EHR, and she received a printed copy. The RDN also provided a handout on strategies for making healthy choices at a food pantry and shopping/cooking on a budget. Mrs KG was encouraged to visit the food pantry earlier in the month knowing that she typically runs out of food by month end.

She helped her access local food pantries and taught her to choose foods such as canned fruits and vegetables and protein sources such as canned fish and tuna and peanut butter that could be saved to the end of the month to offset times when foods are limited. Having these lower-calorie healthier foods available when family and friends “send food to help out” can help provide options that help KG fill up on these foods rather than pizza or fried chicken. She could be encouraged to eat 1 or 2 pieces of pizza rather than more and fill the rest of her plate with fruits and vegetables. Encouraging simple changes such as removing chicken skin from fried chicken can save calories and not affect the carbohydrate content of the meal significantly. They practiced how to tell her relatives about their need for healthy foods and beverages.

Individual PharmD/CPP Visit

Mrs KG's blood sugar log had sporadic readings but did reveal that her finger stick blood sugar (FSBS) was higher in the beginning of the month without any hypoglycemia and relatively lower toward the end of the month with recurrent hypoglycemia, especially after lunch and also after midnight. Although her blood sugar levels were often in the 300s, her A1C at that visit was 7.8% (corresponding

to an average blood sugar of 177). Although her A1C suggested fair blood sugar control, the PharmD said that it really reflected her frequent bouts of hypoglycemia. Mrs KG stated that she limited the times she checked her blood sugar because test strips and lancets were expensive. Mrs KG shared that she took the morning dose of premixed insulin before breakfast and the evening dose at bedtime because she was asked to take it twice a day.

The PharmD checked and found that Mrs KG's insurance would cover the cost of strips and most insulins. Her health plan co-pays made checking her blood glucose more frequently affordable for her and allowed for several cost-effective insulin options. She was offered 2 insulin regimen options: (1) once-a-day basal insulin plus a short-acting insulin 3 times a day with meals or (2) a less complex regimen of once-a-day basal insulin and a short-acting insulin only with largest meal of the day. Mrs KG agreed to start glargine, a long-acting insulin by injection, at bedtime and aspart, a rapid-acting insulin by injection, 3 times a day 15 minutes before meals and resume metformin as tolerated. She was instructed not to skip any meals but, if she missed a meal for any reason, not to take the mealtime dose of aspart. She could, however, take aspart immediately after a meal. Her premixed insulin was discontinued. Insulins glargine and aspart were prescribed as insulin pen devices at reasonable starting doses based on the patient's previous insulin regimen, weight, diet, and recent kidney function test to prevent hypoglycemia. She responded that she thought this insulin timing flexibility could work for her including use of insulin pen as opposed to vial-and-syringe method. The PharmD educated her on the appropriate insulin injection technique with a pen. More information about medication selection for patients with FI and diabetes is provided later in this article.

Individual Visit With the BHC

The BHC evaluated Mrs KG for depression, anxiety, and diabetes-related distress. She was noted to have moderately severe depression using the Patient Health Questionnaire¹⁷ and mild anxiety using the Generalized Anxiety Disorder 7-Item Scale.¹⁸ The Diabetes Distress Scale¹⁹ identified emotional burden. Today, the BHC encouraged Mrs KG to start with modifying eating habits—especially to avoid bingeing and skipping meals. She provided education on using diaphragmatic breathing to cope with her anxiety. They agreed that Mrs KG would see the BHC both during her visits in the diabetes clinic and in scheduled psychotherapy sessions to address her depression with the potential to reduce her need for medication.

Team Assessment and MD Closing Visit

With the knowledge that Mrs KG was food insecure, the team identified recurrent hypoglycemia as the most concerning issue to be addressed in today's visit along with

assisting Mrs KG with information about community resources for those with FI. Her obesity and the medicines including her hypoglycemic and antidepressant agents contributing to weight gain²⁰ were noted but were not directly addressed at this visit. The MD reviewed the plans provided by each of the team members with Mrs KG, obtaining her agreement to implement their recommendations, keep a blood sugar and food log, and return in 2 weeks for follow-up. The MD emphasized that using community resources that the RDN recommended was as important for her health as the medicines he prescribed.

WHAT THE EVIDENCE TELLS US THAT GUIDES OUR TREATMENT

Coping Strategies

Whereas some individuals with limited resources manage without major disruptions to food intake, many cope by eating less or eating less healthy foods some of the time. Patients may prioritize food quantity over quality, "stretch" food, and/or find resources of free food such as friends, family, and food pantries and banks. Several research groups have identified strategies used.^{9,21–27}

Patients may prioritize food quantity over quality, "stretch" food, and/or find resources of free food.

Table 3 is a compilation of those strategies described in the literature. Many individuals may be following these strategies, but even they may not be sufficient to make families food secure. In families with children, Burke and coworkers²³ found that the top 3 strategies and behaviors to change meals were (1) changes in foods purchased or obtained for the household, (2) monetary and shopping strategies, and (3) adaptations in home preparation. The most frequently mentioned foods that were decreased were protein foods (eg, meat, eggs, beans), fruits, and vegetables. The most frequently mentioned foods that were increased were grains and starches (eg, noodles), protein foods (eg, beans, hot dogs), and mixed foods (eg, sandwiches).

While reviewing the food log for adherence to the prescribed therapeutic diet, the RDN or other clinician needs to be alert to coping behaviors. We already noted some of the behaviors that could be identified including getting pizza from her brother, fast-food breakfasts from her sister, and fried chicken from friends when they knew food was short. The family was eating less expensive foods such as ramen noodles and boxed macaroni and cheese or skipping meals at the end of the month. It showed bingeing on

TABLE 3 Coping Strategies Reported by Families With Food Insecurity^{9,21–27}

Attend events primarily to obtain food (eg, church meetings, happy hours at bars)
Avoid filling meds to save money to feed family
Avoid food waste (eg, remove slime from lunch meat, mold and spoiled parts from food, eat out-of-date food)
Avoid medical care
Borrow, trade, and pool resources
Commit petty crime for a jail meal
Deprive self for others
Dilute beverages, stews, and casseroles
Dumpster dive/find roadkill
Eat highly filling foods
Eat low-cost foods/fast food
Eat 1 large meal a day
Eat a small variety of foods
Eat with relatives/friends/church
Eat other people's leftovers
Engage in illegal shopping activity (eg, shoplift, switch price tags)
Lock fridge/pantry
Make an emergency department visit
Overeat when food is available
Put off other expenses/staggering bills
Ration food (eg, put names on food, limit seconds, hide food)
Skip meals/fast
Use food pantries or soup kitchens
Use federal nutrition programs (SNAP, WIC)
Abbreviation: SNAP, Supplemental Nutrition Assistance Program; WIC, women, infants, and children.

cookies early in the month when they were affordable (Table 2).

In addition to working with individual patients, RDNs may choose to educate the community about the benefits of providing healthy foods at food pantries and food banks.²

Avoiding Hypoglycemia

Fear or the perception of fear translates into the patient's self-management of diabetes. Themes that emerge in

studies include that almost half of the respondents (40%) modified their insulin dose and more than half (60%) ate extra food because of fear of hypoglycemia.²⁸ Other researchers concluded that most (63%) changed their lifestyle to include eating extra food regardless of the severity of the event in response to hypoglycemia.²⁹ Hypoglycemia was believed to limit physical activity and blood glucose management, as well as be a barrier to successful weight management and an impediment to a high quality of life. Carlson and coworkers³⁰ remind us that both severe and nonsevere hypoglycemia are often experienced by patients with T2DM as they attempt to follow their clinicians' recommendations for blood glucose management. Patients who experience hypoglycemia often find themselves "feeding their insulin dosage" contributing additional and unwanted calories and weight gain. This combined with FI and the mismatch of carbohydrates, as well as timing of meals and medications, can increase the number of hyperglycemic and hypoglycemic episodes.^{30,31} Newer incretin medications can be useful, but they are expensive.³²

Patients who experience hypoglycemia often find themselves "feeding their insulin dosage" contributing to additional and unwanted calories and weight gain.

FI and Medications for Type 2 Diabetes

Knight and coworkers³³ found that approximately 1 in 6 adults in the 2011 National Health Information Survey with diabetes reported FI. Almost 19% reported that they reduced, delayed, or avoided medication use. There are strategies clinicians can use to help patients do a better job of managing their T2DM while with FI. The number and type of pharmacological options to manage blood glucose levels grow yearly. We and others previously reviewed the interactions between medical nutrition therapy and pharmacotherapy for diabetes.^{30–32,34} Complexity of the regimen and multiple daily dosing are barriers to medication adherence.³⁵ In our clinical experience, we have noted a trend toward prescribing long-acting medications to minimize the number of times per day a patient takes a medication in the hope of improving medication adherence. This approach may not be appropriate for patients with FI. Suspecting and assessing FI help choose diabetes medications and when to take them to avoid hypoglycemia while targeting a reasonable glycemic target. In patients with T2DM, metformin is the first-line medication. It is inexpensive and

should be continued even if patient is started on insulin as long as it is tolerated and not contraindicated. Along with decreasing hepatic glucose production, it improves insulin sensitivity by increasing peripheral glucose uptake and utilization. In patients with T2DM who are intensively treated with insulin, the combination of insulin and metformin achieves superior glycemic control compared with insulin therapy alone, whereas insulin requirements and weight gain are less.³⁶ Thiazolidinediones (eg, pioglitazone) are also inexpensive insulin sensitizers that rarely cause hypoglycemia by themselves; however, they can lead to weight gain, edema, heart failure exacerbation, and fractures. If using a sulfonylurea, glipizide is a relatively short-acting sulfonylurea that can be taken twice a day with meals when food is available. Patients should be informed to skip the glipizide dose if not eating a meal for any reason. Extended-release glipizide formulation is available, which should be avoided in patients with FI to prevent hypoglycemia. Meglitinides (repaglinide and nateglinide) are a reasonable alternative to sulfonylureas. Their mechanism of action is similar to sulfonylureas but offer dosing flexibility due to a shorter half-life. To avoid hypoglycemia, they can be taken before an available meal. However, both sulfonylureas and meglitinides can cause weight gain. There are several new classes of diabetes medicines that are being prescribed to achieve glucose control while minimizing weight gain. Dipeptidyl peptidase-4 inhibitors, also known as gliptins, are weight neutral; their action is glucose dependent (they work when blood sugar starts increasing, eg, after a meal), and as a result, they have less risk of hypoglycemia than sulfonylureas. In addition to patients with FI, they are also safe for use in elderly patients and patients with chronic kidney disease as long as the dose is adjusted based on the kidney function (except linagliptin, which does not need renal dose adjustment). Glucagon-like peptide-1 receptor agents, also known as incretin mimetics, promote weight loss along with glycemic control. However, in a patient with binge eating, adverse effects including nutrient deficiencies can result from a decreased appetite or nausea and vomiting caused by decreased gastric motility. Sodium-glucose cotransporter-2 inhibitors are also safer in patients with FI due to less risk of hypoglycemia. They may lead to weight loss but can cause urinary tract infections and vaginal yeast infection. Unfortunately, dipeptidyl peptidase-4 inhibitors, glucagonlike peptide-1 agonists, and sodium-glucose cotransporter-2 inhibitors are all expensive.

For patients with FI who need insulin to achieve their glycemic target, the American Diabetes Association³⁵ recommends short-acting insulin analogs that can be used immediately after meal consumption, whenever food becomes available. These insulin analogs may prove costly. However, many pharmaceutical companies offer free medications through patient assistance programs. In our clinic,

patients are assisted in registering for such patient assistance programs. If short-acting insulin analogs are not accessible for patients with FI, a relatively low dose of an ultralong-acting insulin analog may be prescribed to prevent marked hyperglycemia, while recognizing that tight control may not be possible in those patients.

We prescribed insulin pen devices to Mrs KG because of their several advantages over the traditional vial-and-syringe method of insulin delivery, including improved patient satisfaction and adherence, greater ease of use, superior accuracy for delivering small doses of insulin, greater social acceptability, and less reported injection pain. Insulin pens are becoming increasingly user-friendly, requiring little formal instruction.³⁷ In Mrs KG's case, the PCP did follow American Diabetes Association recommended pharmacologic algorithm for diabetes management when her A1C target was not achieved with metformin monotherapy.³⁵ She was started on a sulfonylurea (Glimepiride) and later on a premixed insulin. However, without knowledge of her FI, this regimen put her at risk of recurrent hypoglycemia, and her glycemic target was not achieved. Clinicians need to be aware that, in a setting of frequent or severe hypoglycemia before adjusting glycemic targets or adding medications, screen for FI; tie medications to meals, rather than time of day; and prioritize medications with low hypoglycemic risk or short half-life.

Community Resources

Food Pantries

Practitioners can play a role outside the clinical encounter by partnering with emergency food providers to influence the food supply, the food environment, and nutrition education at the pantries. Pantries range from no choice (eg, provide a box) to those that do not restrict choice (eg, shelves of items clients can choose from). Wilson³⁸ makes the case for using “nudges” a concept from behavioral economics and consumer research to help pantry customers select healthier items. This is especially important if the patients being served chronically rely on assistance. Simmet and coworkers³⁹ found that some pantries are responding by limiting the kinds of donations to those that meet the health needs of their participants. Other pantry staff are reluctant to decline items of low nutritional quality fearing negative donor reactions. In addition, many staff may not have the background to develop strategies to ensure the quality of the food and nutrition education for clients. Shanks⁴⁰ describes a variety of ways RDNs and other clinicians can assist food banks and food pantries make their healthier items more convenient and normal to select. Clinicians also can advocate for food and nutrition education, hands-on cooking classes, community gardens, mobile food markets, and pantries on the grounds of the clinics and hospitals.⁴⁰

Follow-Up Visit (Visit 2) With Diabetes Interprofessional Diabetes Team

Mrs KG's food and blood sugar log along with her medications and glucometer were reviewed and showed no low blood sugars. She reported improved energy and improved sleep due to no nocturnal hypoglycemia or polyuria. She obtained some staples from a food pantry and completed the applications for reduced price meals at school and supplemental weekend food for the children. Mrs KG now reported limitation in exercise because of knee pain. She had gained 3 lb and asked for help with weight management. She was worried about further weight gain with continued insulin injections. The RDN and Mrs KG began to develop a food plan and discussed appropriate serving sizes, especially of calorie-dense foods. The RDN again reviewed strategies for avoiding and recognizing hypoglycemia and hyperglycemia. She provided a stretch band and instructed in resistance exercises as tolerated and encouraged daily walking. The PharmD confirmed that the patient was injecting insulin with a proper technique and tolerating metformin. Mrs KG reported that the sessions with the BHC were helpful and she would like to continue those sessions. At the end of this visit, Mrs KG and the MD agreed to contact her PCP to return her diabetes care to her. The MD also recommended switching her antidepressant medication from weight-promoting mirtazapine to bupropion, which promotes weight loss.⁴¹ Antidepressant medication use has been shown to be associated with improved glycemic control.⁴²

SUMMARY

Healthcare professionals have a unique opportunity to improve the health of their patients with FI and chronic diseases such as diabetes. The mnemonic SEARCH outlines important steps to take.

- S: Screen all patients for FI; document in EHR.
- E: Educate patient with appropriate coping strategies.
- A: Make adjustments in medications; use medications that minimize likelihood of hypoglycemia and those less expensive, when possible.
- R: Recognize FI is typically recurrent but not chronic for many patients.
- C: Connect patients to assistance; normalize FI helping patients accept assistance as needed; assist enrolment in SNAP, child nutrition programs, and other community programs.
- H: Help other health professionals recognize that poor health and FI often exacerbate each other; advocate for services in the clinic, hospital, and community.

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APPENDIX

RESOURCES

- AARP Foundation. Quick guide to food insecurity screening and referral for older patients in primary care. November 2016. <http://aarpfoundation.org/fsscreening>. Accessed November 2016.
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