Addressing social determinants of health as part of managing type 2 diabetes in adults - Practice application

Case Studies

Case 1 - Questions 48-year-old man who is currently homeless

A 48-year-old Hispanic male with type 2 diabetes presents to your clinic for the first time. He discloses that he is currently homeless, sleeping outside or sometimes in shelters. He is on the maximum dose of glimepiride and metformin. He has no history of heart failure, macular edema, or bladder cancer. You see that his Hemoglobin A1C (A1C) was checked last week when he visited the Emergency Department (ED). It was 10.1% then. During that same visit, he also had normal liver function tests (LFTs) and estimated glomerular filtration rate (eGFR).

i) Which of the following statements about diabetes management in this patient and for other patients who are homeless is false?

a) Food insecurity can lead to hypoglycemia and increase complications from diabetes medications especially among patients who are homeless.
b) Improving glucose control is not possible for patients who are homeless and have hyperglycemia.
c) In the County of Los Angeles, some patients who are homeless with chronic disease diagnoses and hospitalizations and/or ED visits are eligible for housing programs paid for by healthcare system.
d) Patients who are homeless have higher rates of medication non-adherence than the general population. They should be assessed for non-adherence before any medication changes are recommended.

This patient assures you that he has been taking his medication regimen accurately for several months and shows you his pill bottles that he transports in his backpack. He is interested in modifying his therapy for better glucose control and motivated to try new therapy if you recommend it.

ii) What is the next best step in therapy?

a) Add a third oral agent like pioglitazone 30 mg day; maximize to 45 mg if needed.
b) Add an SGLT-2 Inhibitor like empagliflozin 25 mg half tablet once daily; reduce glimepiride by 50% for the first month.
c) Add a GLP-1 Agonist like exenatide 2 mg subcutaneously every 7 days.
d) Add bedtime NPH insulin, i.e., Bedtime Insulin Daytime Oral (BIDO) Therapy.
Case 1 - Answers

48-year-old man who is homeless

i) Answer: b
This patient is homeless and therefore, a careful assessment of psychosocial factors is important, including food insecurity, social support, depression, perceived stress, and housing, all of which can play a role in overall quality of life and glycemic control. Research has shown that “… homeless people with diabetes usually prioritize food, shelter, and employment well above diabetes self-care and obtaining medical care.” (Elder & Tubb, 2014, page.7). The American Diabetes Association 2018 Standards of Care (page S11) recommends: “In those with diabetes and food insecurity, the priority is mitigating the increased risk for uncontrolled hyperglycemia and severe hypoglycemia.” That being said, improvement of hyperglycemia is possible in individuals who are homeless, especially when attention is paid to addressing barriers to food insecurity and housing, and to medication adherence (Brehove et al., 2007, Health Care for the Homeless Clinician's Network; Kushel, Vittinghoff, & Haas, 2001). This patient would benefit from a referral to a Social Worker for evaluation of his eligibility for the County of Los Angeles’ housing programs such as those operated by Housing for Health (http://dhs.lacounty.gov/wps/portal/dhs/housingforhealth) – this program provides housing assistance for those with chronic medical conditions and high rates of healthcare utilization.

ii) Answer: a
This patient is less than 50 years of age, with uncomplicated diabetes, no significant comorbidities, no hypoglycemic episodes, and normal LFTs. His A1C target is 7% (Abbasi, 2018) but higher targets may be appropriate when taking into account his complex social situation. The next step is to add a third oral agent pioglitazone 30 mg daily, which can then be maximized to 45 mg per day, after ensuring that the patient can tolerate the medication without developing fluid retention/leg edema. See supplemental “Type 2 Diabetes Mellitus: Suggested Outpatient Treatment Algorithm.”
A 67-year-old woman is followed in your primary care clinic for type 2 diabetes. She comes in for follow-up and labs reveal that her A1C of 9.5% is not at her target goal. She takes glimepiride 4 mg daily and metformin 1000 mg twice a day. She has a history of heart failure and macular edema. Her LFTs and eGFR are within normal range, but her body mass index (BMI) is 34.0.

i) What is the next best step in therapy?

a) Increase glimepiride to 8 mg.

b) Add pioglitazone 30 mg day; maximize to 45 mg if needed.

c) Add an SGLT-2 Inhibitor like empagliflozin 25 mg half tablet once daily; reduce glimepiride by 50% for the first month.

d) Add a GLP-1 Agonist like exenatide extended-release 2 mg subcutaneously every 7 days.

As you counsel her on your recommendation for a new medication regimen, she seems reluctant to take additional medications. On further questioning, she expresses interest in modifying her diet to improve glucose control rather than adding additional “pills”.

ii) What evidence-based strategies or interventions can you recommend that will help her manage her diabetes?

a) Tell her that her BMI should be below 25 for optimal glucose control and instruct her to lose weight.

b) Tell her to exercise 150-300 minutes per week to improve her glucose control.

c) Recommend she switch to the “Atkins diet” to eliminate carbohydrates in her diet.

d) Educate her on the availability of evidence-based programs for chronic disease management such as the Diabetes Self-Management Education (DSME) program and the Chronic Disease Self-Management Program (CDSMP): both 6-week programs are designed to build skills for goal-setting to help manage diabetes and/or related chronic conditions.
i) **Answer: c**
This patient has a history of heart failure and macular edema. Due to the existing cardiovascular disease, her A1C target should be closer to 8%. Pioglitazone should not be used in patients with New York Heart Association Functional Class III or IV heart failure, macular edema, bladder cancer, or in those at increased risk of bone fracture. This patient can be continued on oral regimen by adding empagliflozin while reducing the glimepiride dose by 50% for the first month; the latter action will help minimize the potential for hypoglycemia. Empagliflozin, if tolerated, should be continued irrespective of the A1C target achieved, due to the medication’s cardiovascular protective effect for patients with known coronary artery disease or heart failure. See supplemental “Type 2 Diabetes Mellitus: Suggested Outpatient Treatment Algorithm.”

ii) **Answer: d**
Lifestyle modification can be an important tool in improving outcomes for patients with type 2 diabetes, but these evidence-based interventions are often not immediately accessible or beyond the scope of a primary care or specialty visit. This patient can benefit from lifestyle change programs and may achieve better glycemic control without significant escalation of her medication regimen. A lower BMI, more regular exercise and less carbohydrates in her diet should all help glycemic control. Evidence-based programming such as Diabetes Self-Management Education (DSME) and the Chronic Disease Self-Management (CDSM) program are available in the community. Referrals to these programs (which are typically available in both English and Spanish) can be made through an online tool such as One Degree (https://www.1degree.org/) or through telephonic services such as 211 LA County (https://www.211la.org/). Both DSME and/or CDSMP are low or no-cost at various locations across the county. Patients who are referred to these 6-week group programs (typically led by a peer educator) can build skills to set realistic goals about lifestyle modification and problem-solve obstacles that may impede taking steps toward these goals. DSME and CDSMP have been studied extensively and are associated with improved patient outcomes, including improved mental health and decreased hospitalization due to chronic disease complications.
A 60-year-old Spanish-speaking woman is being followed in your primary care clinic for type 2 diabetes. She has been taking a combination of empagliflozin 25 mg half tablet daily, metformin 1000 mg twice a day and glimepiride 4 mg once daily for the past 6 months. The patient has a history of total hysterectomy at age 40, a myocardial infarction 2 years ago, and osteoporosis. Her BMI is 18, A1C is 7.9%, and eGFR is 55.

i) What is the next best step in therapy?

a) Add a third oral agent, like pioglitazone 30 mg day; maximize to 45 mg if needed.
b) Increase empagliflozin to 25 mg one tablet daily; reduce glimepiride by 50% for the first month.
c) Add a GLP-1 Agonist like exenatide extended-release 2 mg subcutaneously every 7 days.
d) Continue current therapy.

As you review her blood pressure and other intake values, you noticed that her Patient Health Questionnaire-2 (PHQ-2) was positive for both screening items and the score for the follow-up PHQ-9 (performed by one of your clinic nurses) revealed an elevated value of 12. During the clinic encounter (interview), she was tearful and reported several months of insomnia. Her mother passed away last year; ever since then she has not felt well.

ii) Which of the following statements about depression and diabetes is false?

a) Persons with diabetes are twice as likely to be diagnosed with depression as persons without diabetes.
b) The prevalence of diabetes and depression coexisting together is higher among men than among women.
c) Treating depression in patients with diabetes can result in improved glycemic control.
d) Cognitive Behavioral Therapy (CBT) is an evidence-based intervention option for treating depression in patients with diabetes. Because a majority of Los Angeles County residents including Medi-Cal and “My Health LA” patients have access to mental health services through their health plans, managing depression via CBT represents an important opportunity to optimize the care of diabetics in the county.
Case 3 - Answers

60-year-old Spanish-speaking woman with depression

i) Answer: d
This patient has known coronary artery disease and by self-report appears to have psychological distress due to losing her mother. Her A1C target should be close to 8% and she is indeed at target with a A1C of 7.9%. Her current therapy, which includes empagliflozin for its cardiovascular protective effect, seems to be working for her. Therefore, no change in her medications is needed at this time and her current therapy should be continued. See supplemental “Type 2 Diabetes Mellitus: Suggested Outpatient Treatment Algorithm.”

ii) Answer: b
Research has shown that depression can occur concurrently with and/or worsen type 2 diabetes. In one meta-analysis, the odds of depression were twice as high among patients with diabetes as patients without the condition. Women with diabetes are significantly more likely to have depression than men with diabetes (citation: Anderson et al., 2001). There is growing evidence to suggest that treating depression with cognitive behavioral therapy (CBT) improves hyperglycemia and quality of life (citation: Markowitz et al., 2011). In the County of Los Angeles, all individuals enrolled in a Medi-Cal Managed Care program have coverage for CBT and can use the service for managing mild-to-moderate depression. Both of the managed care health plans that cover patients from the County of Los Angeles Department of Health Services (DHS) – LA Care and Health Net – have large networks of licensed clinical therapists that offer CBT and other counseling services. Patients enrolled in these two health plans can access these treatments and services without a referral. Patients enrolled in My Health LA can also access mental health services, either through embedded programs offered at select Federally Qualified Health Centers or through the County of Los Angeles Department of Mental Health’s Access Hotline (1-800-854-7771).
A 31-year-old Cantonese speaking man with type 2 diabetes comes to your primary care clinic for the first time. He takes metformin 500 mg twice a day, glipizide 20mg twice a day, and pioglitazone 45mg daily. He has a history of medullary thyroid cancer at age 30. His A1C level is 8.5% and eGFR is 38.

i) What is the next best step in therapy?

a) Increase metformin to 1000 mg twice a day.
b) Add a SGLT-2 Inhibitor like empagliflozin 25 mg half tablet once daily; reduce glimepiride by 50% for the first month.
c) Add a GLP-1 Agonist like exenatide extended-release 2 mg subcutaneously every 7 days.
d) Add bedtime NPH insulin (BIDO Therapy).

Through a medical interpreter, the patient expresses concern about the lower blood sugar that he has observed, more often than not at the end of each month when he starts to run low on food. Although he was recently granted his US Citizenship and is happy to be working a better job and receiving health care through Medi-Cal, he still struggles to provide food to his family each month.

ii) What is the most sustainable intervention that you can recommend for this patient’s food insecurity?

a) Give him a box of juice and a sandwich today since he is hungry.
b) Give him a handout of local food pantries he can access for free food.
c) Screen for eligibility and refer him to a site where he can enroll in CalFresh (food stamps).
d) Refer him to a meal delivery service for seniors since he lives with his parents.
Case 4 - Answers

31-year-old man with history of thyroid cancer

i) Answer: d
The A1C target for this patient should ideally be <7%, but it could be higher depending upon presence or absence of other factors such as difficult social (poverty, food insecurity) circumstances. He is on the maximum dose of sulfonylurea and pioglitazone. The metformin dose cannot be further increased since his eGFR is <45. He is not a candidate for exenatide because of his history of medullary thyroid cancer. Empagliflozin cannot be added either because of an eGFR <45. The next best therapy is to start this patient on bedtime NPH insulin. See supplemental “Type 2 Diabetes Mellitus: Suggested Outpatient Treatment Algorithm.”

ii) Answer: c
This patient is suffering from food insecurity and it is clearly affecting his health and the health provider’s ability to safely manage his diabetes using medications. Food insecurity is known to cause both more frequent hypoglycemic episodes and higher average blood glucose levels (citation: Seligman et al., 2010). The most impactful intervention for any person experiencing food insecurity is a referral to the United States Department of Agriculture’s Supplemental Nutrition Assistance Program (SNAP); in California, this program is called CalFresh (http://www.cdss.ca.gov/food-nutrition/calfresh). CalFresh is available to low-income individuals and families. The program provides money each month to be spent on food at any grocery store or farmer’s market authorized to accept CalFresh electronic benefit transfer (EBT). For immigrants living in the County of Los Angeles, it is important to screen carefully for eligibility. Low-income citizens are eligible for CalFresh if they meet the income requirements; non-citizens may also be eligible, either through their U.S.-born children or by themselves in special circumstances. A referral to a social worker (e.g., in the clinic or at an office of the Department of Public Social Services, County of Los Angeles County) is recommended for this patient. The social worker can assist him with eligibility determination and enrollment in the CalFresh program.
A 40-year-old Hispanic man comes to your primary care clinic for a follow-up. He was diagnosed with type 2 diabetes mellitus and hypertension after being hospitalized 6 months ago for myocardial infarction. He has quit smoking since the hospital discharge. His A1C is currently 8.5% and eGFR is 60. He takes metformin 1000 mg twice a day.

i) What is the next best step in therapy?

a) Add glimepiride 2 mg and titrate dose upwards if needed.

b) Start empagliflozin as dual oral therapy with metformin.

c) Start exenatide extended-release as dual oral therapy with metformin.

d) Continue current therapy and repeat A1C in 6 months.

The patient has made some healthy lifestyle changes to quit smoking and seems motivated to continue to make changes to manage his chronic conditions. When asked about exercise, he says that he would consider walking for exercise but seems hesitant to commit to a walking regimen. He eventually expresses concern that it might not be safe for him to walk in his neighborhood after work.

ii) Given his concerns about neighborhood safety, what resources can you suggest or provide to him that would address the environmental barrier(s) to walking he is facing?

a) The patient may be eligible for reduced cost membership to his local YMCA where he can use the treadmills to walk for exercise.

b) There may be low cost exercise classes at his local city recreation center.

c) There may be walking groups or evidence-based walking programs like *Walk with Ease* which he can attend for free, at a variety of community-based locations.

d) All of the above; AND you can refer him using *One Degree* (https://www.1degree.org/) or refer him to The Wellness Center at the Historic Hospital on the campus of the LAC+USC Medical Center where a Wellness Navigator can reach out to him and link him to the best option tailored based on his needs, schedule, and home location.
Case 5: Answers

40-year-old man with hypertension and history of myocardial infarction

i) Answer: b
This patient is less than 50 years old, with a recent diagnosis of type 2 diabetes. His A1C target should be <7% if he did not have any coronary artery disease (CAD), but since he does have CAD, a higher target is acceptable. His eGFR is >45 and he has no contraindications to add empagliflozin (he is circumcised). Empagliflozin should be added and, if tolerated, continued irrespective of the A1C target achieved due to its cardiovascular protective effect in patients with known CAD or heart failure.

ii) Answer: d
Environmental barriers to regular exercise have been shown to have significant effects on the health of low-income populations. Fortunately, in the County of Los Angeles, we have a number of public health interventions designed to make access to safe places to exercise easier. The YMCA of Los Angeles has 26 locations throughout the county. Financial assistance is available to those who cannot afford membership fees (1 in 3 current members receives this assistance each year). The City and County of Los Angeles departments of parks and recreation offer free or low-cost exercise classes at many of its public parks. Because it is difficult to find time to search for these resources during a typical clinic visit, engineering search and referral protocols into the routine workflows of healthcare teams or medical homes is highly recommended – i.e., a team member other than a physician or the treating provider (medical assistant, community health worker) can be assigned to help patients find local community resources for exercise using tools such as One Degree (https://www.1degree.org/).

For more information, please consult the following resources:
Park/Open Space Locations: Parks and Recreation
YMCA Locations: YMCAs
A 50-year-old African American man with type 2 diabetes presents to urgent care for medication refills. He is about to run out of his insulin and does not have active health insurance. He has been checking his glucose level regularly, as evidenced by his finger-stick log, which he brought to the clinic visit. He is currently on the maximum of triple oral therapy, along with empagliflozin and NPH insulin 20 units at bedtime. He has a history of coronary artery stent placement 3 years ago. He eats small bedtime snacks. He reports no nocturnal hypoglycemia. His blood glucose reports the following ranges: before breakfast 100–120 mg/dL; before lunch 190–220 mg/dL; before dinner 190–220 mg/dL; bedtime 200–240 mg/dL. No report of hypoglycemic episodes. His A1C is 9.2 and eGFR is normal. He was first diagnosed with type 2 diabetes ten years ago when his big toe had to be amputated due to an infected ulcer. He expresses determination not to have any further amputations and says he is willing to go on maximum insulin regimen twice a day.

i) What is the next best step in therapy?

a) Continue current therapy with NPH insulin 20 units at bedtime.
b) Increase NPH dose to 24 units at bedtime.
c) Discontinue NPH and start glargine 20 units at bedtime.
d) Discontinue oral antidiabetic medications except for metformin and empagliflozin. Intensify insulin therapy: start self-mixed split regimen (NPH + Regular).

ii) The patient requests assistance with enrolling in health insurance for him and for his entire family. Which of the following statements about access to healthcare is false?

a) All low-income children in California are eligible for Medi-Cal including undocumented immigrants.
b) Once this patient successfully enrolls in Medi-Cal, first he will be asked to choose his primary care doctor and then he will be assigned to a managed care plan that includes his chosen doctor.
c) Low-income individuals who are not eligible for Medi-Cal because of their immigration status can enroll in My Health LA which covers primary care, specialty care, hospitalizations, preventive care, and prescription drugs.
d) Effective January 1, 2019, the Diabetes Prevention Program (DPP) will be a Medi-Cal covered benefit.
i) Answer: d
This patient is 50 years of age with a long-standing history of type 2 diabetes. His A1C target should be <7% but since he has known coronary artery disease, the target can be higher. He is on bedtime insulin therapy with maximum doses of oral medications and has not reached his target. Based on pre-breakfast glucose level, no changes in NPH dose is needed. However, his glucose levels are well above target range before lunch, before dinner, and at bedtime on the current dose, with a gap of greater than 50 mg/dL. Because starting bedtime glargine will likely result in overnight hypoglycemia and as this patient is willing to take maximum twice a day insulin regimen, intensifying Insulin therapy with NPH/Regular would be the best next step. Metformin should be continued while intensifying insulin therapy. Since patient has known coronary artery disease, empagliflozin should be continued irrespective of the A1C target achieved due to the medication’s cardiovascular protective effect. The other oral agents should be discontinued. See supplemental “Type 2 Diabetes Mellitus: Suggested Outpatient Treatment Algorithm.”

ii) Answer: b
Fortunately, in Los Angeles County, most individuals are eligible for a healthcare program that covers the care that is necessary to manage Type II Diabetes. Low-income individuals should be screened for Medi-Cal eligibility. It is important to remember that navigating Medi-Cal, even after enrolled, can be challenging and confusion about how to use Medi-Cal benefits remains a barrier to continuity of care and management of chronic diseases. In this patient’s case, he may need assistance with navigating the step after enrollment where he will be asked to choose a Health Plan and then a provider and then needs to make an appointment with this provider to establish care.

It is also important to note that low-income individuals who are not eligible for Medi-Cal because of their immigration status are likely to be eligible for My Health LA which covers primary care, medications, specialty care, hospitalizations and much more. Patients can enroll in My Health LA by presenting to one of the Federally Qualified Health Centers (see this link for a full list of enrolled clinics: http://dhs.lacounty.gov/wps/portal/dhs/mhla/findaclinic) that participate in the program or by visiting The Wellness Center at LAC+USC where they will receive comprehensive enrollment screening and assistance.