

Diabetes: Identifying and Educating High-Risk Individuals



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00:17

Dr. Jane Caldwell

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01:01

Dr. Jane Caldwell

Today *On Medical Grounds* we will be speaking with Dr. Heather Whitley about screening and diagnosis of prediabetes and diabetes. Dr. Heather Whitley is a clinical professor in the Department of Pharmacy Practice at the Auburn University, Harrison College of Pharmacy. She is a board-certified pharmacotherapy specialist and a certified diabetes care and education specialist. Dr. Whitley has published approximately 50 manuscripts predominantly on her diabetes-related research. Dr. Whitley is closely involved with the Southeastern Diabetes Education Services by supporting Camp Seale Harris as an on-site pharmacist. There she cares for children with type one diabetes at overnight camps while teaching her pharmacy students on-site.

Hello Dr. Whitley, welcome to *On Medical Grounds*.

Dr. Heather Whitley

Hello, thank you so much for having me today.

01:59

Dr. Jane Caldwell

Tell us about your research with diabetes.

Dr. Heather Whitley

It has been my pleasure to serve as a clinical pharmacist in Alabama for the past 15 years or so. And while I'm taking care of many patients in the rural and urban settings with type 2 and type 1 diabetes, I also have a line of research that follows along. One is a great interest that I have in the differences in outcomes

between the glucagon-like peptide 1 receptor agonist and the SGLT-2 inhibitors, particularly in terms of benefits on cardiovascular and renal trials.

I have another line investigating scholarship of teaching and learning for increasing empathy in our learners, both pharmacy students and medical students, so that when they go out and become practitioners in the field, they have a greater appreciation for the efforts that their patients with diabetes participate in to maintain their health.

Lastly, I have a line of research involving point-of-care A1c testing to help facilitate the diagnosis of diabetes and prediabetes.

You probably know that there is a large proportion of our population in America that has diabetes. Last it was evaluated as about 11.5% and of that, there's a very large proportion, about 23% of these adults that unknowingly have hyperglycemia. They have not yet been diagnosed with diabetes, or at least aren't aware of the diagnosis.

Additionally, about one in three or almost 40% of the adult population has prediabetes, which means that their blood sugar is elevated above a normal level, but not quite to the extent to be able to be diagnosed with diabetes; and of that population, 17% are unaware of their diagnosis.

03:48

Dr. Jane Caldwell

Well, that leads directly to my next question. I understand that large numbers of individuals with prediabetes are not being screened or diagnosed. What are some strategies that healthcare professionals could implement to alleviate this gap?

Dr. Heather Whitley

There are several steps that we can take. First, as practitioners, we need to be aware of who needs to be screened. We need to think about how to screen, we need to be intentional about screening, and then we need to think about what to do with those results.

Let's start with who to screen. According to the guidelines we have, the American Diabetes Association guidelines, they recommend screening asymptomatic adults ages 45 years or older that are overweight or obese. They might have a risk factor for diabetes, including a first-degree relative [who has it], physical inactivity, or [be in] a high-risk ethnic group and screen those people for diabetes.

Another guideline, the USPSTF, recommends a little bit different group of people to screen for diabetes. They have a difference in age. They recommend people between the ages of 35, so a bit lower than what we see with the ADA, up to 70 years of age who are also overweight or obese and screening them for diabetes.

05:06

Dr. Jane Caldwell

Could you run us through the testing methodologies for prediabetes and diabetes screening and diagnosis?

Dr. Heather Whitley

There's four different ways of screening for prediabetes or diabetes. The first and most common that we probably see is fasting blood glucose, and that can be done with a finger prick in-clinic or in the hospital, or by venipuncture. They're looking for the concentration of glucose in the blood at that point of time, which should be without drinking or eating any food or beverage for eight hours prior to the tests. For prediabetes, that's evaluated with an outcome of between 100 and 125 milligrams per deciliter. And then a diagnosis of diabetes would be greater than that, so greater than 126 milligrams per deciliter.

Another, but more cumbersome method of screening for diabetes, is two hours after a standardized 75-gram oral glucose tolerance test. This is most commonly conducted when evaluating for gestational diabetes, but it can be done in adults outside of pregnancy as well. It just requires more planning. For prediabetes, that's an outcome between 140 and 199, and for diabetes it's an outcome greater than 200.

We also have a random blood glucose test, and this was something that you might conduct in the clinic when a patient comes in complaining of typical symptoms of hyperglycemia. So, headache, nausea, polyurea, polydipsia, polyphagia, and if the outcome of the blood sugar test is greater than 200 accompanied with those symptoms, that is indicative of diabetes.

And then lastly, it's the hemoglobin A1c. So, the A1c evaluates the blood glucose over the past two to three months. So, whereas all the other test methodologies that I mentioned provides a point in time blood glucose measure, the A1c accounts for daily fluctuations over this two to three month period of time. For prediabetes, that range is between 7.5 and 6.4% and for diabetes it's 6.5% or higher.

07:37

Dr. Jane Caldwell

Well, thank you for that summary. Have you conducted research using point-of-care tests?

Dr. Heather Whitley

Yes, I have. It's one of my favorite research projects I've conducted over time. I've performed a point-of-care A1c test both in the rural setting of Alabama and then also collaborated on some investigations in more urban settings. Both of these different research projects required intentional screening, and that's something that I would put forth to any of your listeners if they are interested in improving the diagnostic rate or helping to improve evaluation of those people that have diabetes or that unknowingly have hyperglycemia. It takes intentionality. And so, being aware of those screening recommendations according to the guidelines and finding a way that implement those into your practice, whether it's through pulling a registry from your electronic medical record, sending letters to your patients, or just flagging the records for that when the patient comes in, they can be screened at that time.

With the research that I've conducted, we provided free point-of-care A1c testing to people that met criteria and in this case, it was those adults 45 years of age or older that had not already been diagnosed with diabetes and did not have an A1c test in the past year. Through actively screening these adults with point-of-care A1c tests, we found that 63% were unknowingly living in chronic hyperglycemia. 53% was in the prediabetes range.

09:13

Dr. Jane Caldwell

Wow, those are interesting numbers. Are there benefits to point-of-care tests for HbA1c compared to other methods?

Dr. Heather Whitley

Yes, there are certainly benefits that we see. First, it provides a very timely outcome. If an A1c test is conducted by a laboratory draw where the blood is drawn in-clinic and then sent to an outside laboratory, that result comes back the next day, and so it hinders the opportunity for the patient and the provider to have a timely conversation about the results of that test. There have been plenty of times when a patient has come to me and said yes, let's test my A1c. We get an A1c point-of-care test. The result comes back, and the patient is surprised by the outcome, whether it's lower than they expected, and we can all cheer that the implementations that they've made for their behavioral modifications made a difference.

Or it's been higher than the patient has expected and they decided at that point to make tremendous or significant adjustments to their lifestyle. Or we can talk about therapies that we can implement at that time, whether it's addition of a new drug therapy or increasing or intensifying their pharmaco regimen. So the point-of-care A1c test truly helps to avoid that clinical inertia that we see as such a problem in the care of chronic disease states.

10:40

Dr. Jane Caldwell

Can you share the guidelines for screening and diagnosis of prediabetes and diabetes in community and urgent care settings?

Dr. Heather Whitley

Sure, so for prediabetes and diabetes we are recommending screening patients that are overweight or obese, that are 35 years of age to 70, or use some guidelines which recommend ages 45 years of age or higher. And we can do it by any of those methods that we talked about: the fasting blood glucose, the two-hour postprandial 75-gram glucose load, A1c, or random blood glucose tests. And the urgent care setting is a little bit different. There they found that 75% of urgent care patients have a primary care provider. But that leaves 25% of people presenting to the urgent care room without that primary care provider. So, when patients come to the urgent care setting, it's recommended that we as practitioners consider screening for prediabetes or diabetes at that time, particularly if any of their symptoms or complaints or body mass index lines up with a recommendation for screening.

Additionally, in the hospital setting, if a patient presents with a major cardiovascular event, such as a heart attack or a stroke, we should be screening for patients at that time as well [for diabetes]. People with diabetes, whether it's prediabetes or full diagnosed diabetes are at twofold greater risk of experiencing a major adverse cardiovascular event in their life. So people that come and present with a heart attack or present with a stroke it's quite possible that they have undiagnosed hyperglycemia existing in the background. So, it's completely reasonable to screen them at that point in time. Probably better to use an A1c rather than a blood glucose test. First of all, when patients are in a stress condition, their blood sugar can go up and so they could get a false positive by a point-of-care blood sugar test. A1c takes that out as a factor. Because it is evaluating the glycemic fluctuations over a two to three month period, it doesn't evaluate this point-of-care blood sugar that can have hyperglycemia induced by stress.

13:11

Dr. Jane Caldwell

Giving results quickly for preventive care is a no brainer, but do you have any data on cost savings?

Dr. Heather Whitley

It's found that point-of-care A1c test units are usually a little bit pricier, a little bit higher cost than testing A1c by a central laboratory. But the cost benefit comes in a reduction of operational costs where when you get a central laboratory A1c result and it comes back the next day and say it's abnormal. Then that patient needs to be telephoned. The practitioner needs to take time to call the patient to let them know of the result, or maybe send a result letter to the patient which takes time and money as well. Or schedule a second follow up visit to discuss that abnormal result. But if we could use a point-of-care A1c test that removes all of that extra operational cost and improves efficiency, thereby reducing costs overall. Additionally, it's found that by using this point-of-care A1c test, it improves access to that evaluation for the patient. So that it also results in better, quicker A1c control or glycemic control. And as we know, chronic hyperglycemia has risks. It is the number one cause of blindness and amputations and kidney failure resulting in the need for dialysis. So, the outcomes are very real and truly have a negative impact on our patients. So, if we can be more efficient in implementing a method of screening for and diagnosing and monitoring hyperglycemia on our patients, we can truly impact not only the health and quality of life of our patients but also save the healthcare system money as well.

15:01

Dr. Jane Caldwell

Have you used point-of-care tests in any community outreach programs?

Dr. Heather Whitley

I have. At Auburn University we've seen it used a handful of times in health screenings. They might be assessing blood pressure and blood glucose, and they'll also provide point-of-care A1c testing as well. At our institution, we also have an employee-based wellness program where we've used A1c testing. For those patients and individuals with an elevated outcome, we will refer to the National Diabetes Program to help reduce body weight, which ultimately lowers their risk of developing diabetes.

15:40

Dr. Jane Caldwell

So, do you find point-of-care testing for HbA1c is well adapted to say an employer-based wellness program?

Dr. Heather Whitley

Yes, I find that to be very true. It provides patients not only a point-of-care evaluation of their blood sugar, but gives them a perspective of what their blood sugar has been trending over the past two to three months, which I truly believe is much more meaningful than what their blood sugar is only right now at this single point of time.

16:10

Dr. Jane Caldwell

I was intrigued by your interest in the effects of biological sex on medication pharmacokinetics. There's a

suggestion that there are sex-based differences in HbA1c. If these differences are real, is there a concern that it might be impacting treatment, pharmacodynamics, and comorbidities?

Dr. Heather Whitley

I find that really interesting too, of how there's differences in drug therapy modalities and different patient populations. We see that Hispanics and African Americans have a higher A1c compared to white non-Hispanics, which is a difference of about a 0.4 to 0.6% despite the same blood glucose control and a 0.5% difference in A1c is termed clinically significant. So, this difference in A1c can have a meaningful difference and impact of how it might affect patient care at the bedside.

Between men and women, it's a little bit different. We see that men do have a statistically significant higher A1c compared to females between the ages of 30 and 50. But the difference in that A1c, although statistically significant, is not what I would consider clinically significant. The average A1c for men is 5.47 versus female, according to one study, is 5.4. So just a very small difference and although it is present, I don't find it to be a clinically significant difference, therefore wouldn't necessarily impact the direction of care.

17:58

Dr. Jane Caldwell

What were you hoping that I'd ask you today?

Dr. Heather Whitley

As a pharmacist, I always think about how we can expand the utilization of point-of-care A1cs into community pharmacies or pharmacists to be able to implement to improve the outcome. We see that pharmacists are certainly strategically placed as an easy access for patients in a variety of different centers, locations across the country. And we've seen more A1cs going into those community settings. So that if patients are interested in evaluating their glycemic trends over the past two to three months, we can use that more. But even more importantly than that, it's what do we do with that outcome? In some of the studies that I conducted where we found patients that had an A1c in this pre diagnostic range, the most common step that was taken was no step at all. Meaning when we had a patient with an A1c that was above 6.5, so in the diagnostic realm for diabetes, we saw that the practitioners were retesting it to verify the accuracy and then very commonly implementing behavioral modifications or initiating a drug therapy. But it was different when we saw it for people in the prediabetes range. Much less commonly, were they recommending a secondary screening test and they often were not implementing behavioral modifications either.

So, we are allowing this undiagnosed prediabetes to continue to exist, which allows it to continue to progress forward to diabetes. But if we can take a greater effort to implement behavioral modifications, truly helping patients reduce, specifically their body weight by 5 to 7% like we see with the diabetes prevention program, we can offset the onset of developing diabetes by up to 58%, which would really have a tremendous impact in our population and reduce the continued prevalence of diabetes that seems to increase year after year.

20:02

Dr. Jane Caldwell

Those are exciting figures. Dr. Whitley, we appreciate your work in diabetes research, education, and prevention. Thank you so much for taking time from your busy schedule to speak with us.

Dr. Heather Whitley

It's been my pleasure. Thank you for having me.

Dr. Jane Caldwell

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