

EPISODE 17: SPECIAL EDITION - WORLD DIABETES DAY

Rita Kalyani, MD Welcome to *Diabetes Deconstructed*, a podcast for people interested in learning more about diabetes. I'm your host Dr. Rita Kalyani at Johns Hopkins. We developed this podcast as a companion to our Patient Guide to Diabetes website. If you want a trusted and easy to understand resource for diabetes or to listen to previous podcasts, please visit hopkinsdiabetesinfo.org.

For today's podcast it is our great pleasure to welcome back Dr. Mohammad Al-Sofiani, an Assistant Professor of Endocrinology, Diabetes & Metabolism at King Saud University in Riyadh, Saudi Arabia and former Managing Editor of the Johns Hopkins Patient Guide to Diabetes website from 2017 to 2019. Dr. Al-Sofiani serves as the Vice President of the Saudi Society of Endocrinology Metabolism and the Chief Scientific Officer of the first specialized diabetes ecosystem and artificial intelligence platform in the Middle East. His research focuses on the digital transformation of diabetes care in the Middle East to improve the quality, efficiency, and safety of diabetes care and overcome barriers to access to care in various parts of the Middle East. Welcome, Dr. Al-Sofiani.

Mohammed Al-Sofiani, MD Thank you very much, Dr. Kalyani. Very happy to be with you.

RK: We are so glad to have you on the podcast today. And I was wondering if you could start off by talking about what is the current status of diabetes in the United States.

MA So there has been a tremendous growth in the number of people living with diabetes over the past three decades both in the United States as well as globally. And if we look at the numbers from the US, the proportion of people living with diabetes has grown from about 3 to 4% in the '80s to over 10% or 11% of the US population living with diabetes nowadays. And if you think about it, not many diseases have grown in prevalence at this very rapid pace. Some people may appreciate absolute numbers better than proportions or prevalence rates so let me just give you a quick overview of these numbers and put them into perspective. So I think the US population is somewhere around 330 or 335 million individuals – at least this was the number last time I checked. And out of those 335 million individuals, there are approximately 37 million individuals in the US living with diabetes today as we speak, which again translates to 11% of the US population. And this is really a very high number of people to be living with diabetes in just one country. And according to the most recent published reports by the International Diabetes Federation, the US is ranked #4 worldwide in terms of the number of adults living with diabetes coming after China, India, and Pakistan. So yeah, the current burden of diabetes in the US is unfortunately nothing but massive and frightening to say the least.

RK: Wow, it certainly does sound like numbers have been exponentially increasing from the 1980s, like you mentioned. And it's quite concerning to think that the United States is #4 in the world in terms of the number of people with diabetes especially when you think of larger countries that have even greater population, yet, we're still up at the top. It does seem like it is an epidemic. And I know we've heard that word kind of thrown around. How are we going to

address this epidemic? Do you think that the numbers of people with diabetes in the United States are going to get any better or are we going to get worse?

MA So if you look at the projected numbers of people with diabetes in the future, whether you look at the United States data or the global data, the numbers are projected to get even higher as time goes by. We have approximately 1.4 million adults in the US getting diagnosed with diabetes every year. And recently, the CDC, or the Center for Disease Control and Prevention, has published its National Diabetes Statistics Report from the US and estimated that more than 103 million adults are currently living with either diabetes or prediabetes. Again, this is in the United States. And out of these 130 million individuals, 96 million adults have what we call prediabetes. So this is the condition where blood glucose levels are slightly higher than normal but not to the level that these individuals would receive the diagnosis of diabetes. So you could look at it in another way; these are the individuals who are the closest to becoming people with diabetes without having the diabetes diagnosis. So many of these individuals will very likely to go on to develop diabetes within the next few years and add to that pool of people living with diabetes unless we do something about it to prevent this from happening.

RK: So it sounds like, based on what you're describing, that we not only have to recognize the number of people with diabetes that are growing, but people with prediabetes, who very likely could become those with diabetes without further public health initiatives or interventions, and that's such a large proportion of the United States population. What about in the rest of the world? I wonder if you could talk a little bit about what is it like in the Middle East where you are? How about in the rest of the world? Is diabetes confined to just one country, one area? Or is it something that's affecting people everywhere?

MA So yeah, definitely. So it's something that's affecting all people around the globe. So I hate to be the person sharing all these bad news and depressing numbers today with the podcast listeners, but really, the burden of diabetes globally is even worse than it is in the United States. So as we speak, there are over half a billion adults living with diabetes in the world and this translates into 1 in 10 adults that you meet on the street as you travel around the world who would very likely have diabetes. And I think this comes as no surprise to many of us. Whether you live inside or outside the United States, you look around you, chances are someone near you has diabetes or prediabetes. And if you think about it, this could be your brother, your sister, your parents, yourself, your co-worker, or best friend. And we are all impacted by this epidemic in many ways, shapes, and forms. And as I cite these numbers, I always like to remind myself that behind each of these numbers, there is a person who is very likely to be struggling with managing his or her diabetes, and we have to do all we can to help and support this person to win the fight against diabetes which is not easy at all as we all know.

RK: I fully agree. You know, this is not just a problem for the individual. It's a problem for the communities in which they live, for society. It's really a global health problem, as you mentioned that really affects us all and requires all of us to really dedicate attention to reducing the burden of this disease. You know, we talk a lot especially in the COVID or post-COVID era of infectious diseases, communicable diseases, but diabetes is a non-communicable disease. Do you think that as a non-communicable disease, this is its own pandemic in some way?

MA Yes, definitely. So I think there's no question about diabetes being an epidemic that impacts most of us wherever you go. So it's either you would be a person living with diabetes, and if not, you would be a person caring for someone with diabetes, or having friends with diabetes. And I don't think the burden of diabetes as a disease is any less than some of the communicable diseases that we've gone to over the recent years, the latest of which has been the COVID-19 pandemic. And I think also the interaction between the COVID pandemic and diabetes has been one of the very important topics that we've been talking about lately where many of our people with diabetes have been the ones impacted the most by the COVID-19 pandemic. So yeah, it's definitely an epidemic that we should deal with the same way we dealt with the COVID-19 pandemic.

RK: As we're talking about COVID-19, I wonder if you could elaborate a little bit about why COVID-19 hit people with diabetes perhaps a little bit more in severity and also these new onset cases of diabetes that we're seeing after COVID. I wonder if you can talk a little bit more about that interaction.

MA So yeah, so this is one of the very interesting points and things that we've gone through over the past three years. So as you rightfully mentioned, people with diabetes have been impacted the most by this disease whether you look at the risk of COVID-19, the complications of COVID-19, and unfortunately, the mortality from COVID-19 has been higher in people with diabetes. And I think it's partly due to the fact that diabetes, especially type 2 diabetes, comes as a package of diseases rather than just one disease. Many of our people with type 2 diabetes, they usually have other diseases at the same time such as obesity, high cholesterol, high blood pressure, cardiovascular disease, kidney disease. And each one of these diseases is really a risk factor for COVID-19 mortality or severe COVID-19 disease on its own. If you also look at the communities that are typically impacted the most by type 2 diabetes, usually these are the people who are disadvantaged in terms of where they live, their level of education, income, and socio-economic status. And again, each one of these factors is also a risk factor for COVID-19 mortality and severe COVID-19 infection. So there are many factors that diabetes and COVID-19 share in terms of severity of disease and risk of mortality.

RK: It's unfortunate that COVID-19 has impacted so many people and as you mentioned, people with diabetes have higher risk of [developing] severe complications from having COVID-19 infection. Have you seen people in your practice that have developed diabetes after COVID-19? Or heard of cases? And why might this be? Why might people who didn't have diabetes before develop diabetes after COVID-19?

MA Yeah, so this is one of the questions that are being investigated or have been investigated over the past two years. So I have seen some of my patients who are or who were diagnosed with diabetes after they got COVID-19 infection. And some of them present to us in the form of type 2 diabetes where they could eventually do fine with some insulin sensitizers, oral medications. Others may present to us just with the full picture of type 1 diabetes where the insulin-producing cells seem to have stopped functioning and insulin is not being produced by these cells. And I think the literature has also shown that both types of diabetes could follow the infection of COVID-19. So it remains unclear whether COVID-19 infection is a direct cause of diabetes in these individuals, but I think that the incidence rates of diabetes has grown

significantly over the past two years compared to the years prior to the pandemic which is really difficult to just dismiss. I think we're going to learn more about this question as time goes by.

RK: It is very interesting that we have seen this increase in people with diabetes after COVID-19. And, you know, whether it's some people who might have had risk factors already and COVID-19 is what pushes them towards diabetes or other it's something else... I agree, it's something that we're going to continue to hopefully learn more about in the years to come. Just briefly, before we move on, I wonder if you could talk a little bit about vaccinations for COVID-19 in people with diabetes. I think this was a question that I often encountered with patients in my clinic asking whether they were at higher risk for contracting COVID-19 as a person with diabetes and whether the recommendations are any different for vaccination. I wonder if you could talk just briefly about that.

MA We definitely recommend our patients with diabetes to make sure that they get their COVID-19 vaccine. And I think the strongest argument for this (that I always tried to present to some of my patients who might be hesitant to do so) is that we've seen over the past two to three years that people with diabetes are impacted the most by the COVID-19 infection. So they are the people who are more likely to get severe COVID-19 infections, they are the people who are more likely to die from COVID-19, and now we finally have the vaccine to prevent the infection in some people and lower or decrease the severity of COVID-19 should they get the infection. We definitely nowadays treat it the same way we treat the flu vaccine and some of the other routine vaccines that people with diabetes should adhere to.

RK: It does sound like having a COVID vaccine may just be part of the usual vaccines now that we recommend for people with diabetes and even without. I agree, I think that it's so important that patients especially those with diabetes obtain the COVID vaccine. Now moving more broadly, we've talked about COVID-19 and the impacts it has had on the epidemic of diabetes. But what other factors are driving this epidemic? Why are rates for diabetes so high? And why are they projected to increase in the future?

MA I think to answer this question, I need to make sure that the listeners appreciate the difference between type 1 and type 2 diabetes. As the factors driving the increase in each of these types of diabetes are different. So the most common type of diabetes as we know as type 2 diabetes, which affects about 90% of people with diabetes. And this type of diabetes is largely driven by overweight or obesity. So obesity makes the body less responsive to insulin and leads to what we call insulin resistance and eventually type 2 diabetes. So some of the key risk factors for insulin resistance and eventually type 2 diabetes are lack of physical activities, sitting for long periods, excess nutrition, aging, and also having gestational diabetes, which is that transient diabetes that some people get during pregnancy. And any of these factors and someone who has the genetic predisposition to get type 2 diabetes can eventually accelerate this progression from being healthy, or someone with normal glucose levels to someone with prediabetes. So for type 2 diabetes, it's really the combination of genetics and environmental or lifestyle factors that often lead to type 2 diabetes and to this epidemic that we see. The story is a bit different for people with type 1 diabetes, which is an autoimmune disease that can affect any one of us essentially at any time throughout our life. The causes of type 1 diabetes remain largely unknown, but what we know is that it's also probably a combination of genetic and some environmental factors that

put someone at a higher risk of type 1 diabetes. And also, by the way, cases of type 1 diabetes are on the rise both in the United States and worldwide for largely unknown reasons.

RK: It sounds like really whether type 1 or type 2 that projection is that numbers will continue to increase. And perhaps as you mentioned, thanks for making that distinction, the contributing factors while distinct, may still require a very similar targeted prevention effort to really address this ongoing epidemic. You know, we've talked a lot about the rising numbers and the projections and continued rising numbers, but why does this matter? What are the possible consequences of this growing number of people with diabetes in the world?

MA The concern with diabetes is probably not just limited to the disease itself but also to as we say the package of diseases that usually comes with it. So hypertension, or high blood pressure, high cholesterol, high body weight, and also the complications that can result from having poorly controlled glucose for a long period of time. So heart disease, eye diseases, kidney disease, and the list of complications and goes on. And if you add to this also the mental burden of diabetes... so people with diabetes are at a higher risk of having diabetes burnout, depression and anxiety, stress... And if you think about the huge burden of diabetes that we talked about, and then you also think about the potential complications that many of these people are living with, then you start to realize the negative consequences of having such a massive epidemic that we're really failing to stop, at least at the moment. And also not to forget, the diabetes or the fact that diabetes costs our health care system a huge amount of dollars. So I was reading the other day that the total cost of diagnosed diabetes in the United States in 2017 was estimated to be \$327 billion and most of this was just due to the direct medical costs of diabetes. And needless to say, that there is also indirect costs that could result from the reduced productivity of individuals with diabetes and those with diabetes-related complications. So for all these reasons, we should be concerned about this epidemic.

RK: Sounds like there are far-ranging complications and thanks for going through all of those not only related to the comorbidities of diabetes, but also the societal, the work-related and the economic related impacts of diabetes, as well. We've talked a lot about the sobering numbers of people with diabetes and the somewhat grim projections of the increasing numbers of people with diabetes, but there has to be something that can be done. What is being done to address the global burden of diabetes? And what should we be doing? What do you think?

MA Yeah, so I think maybe as you said on the bright side of things, there have been some exciting work and studies showing how modifying the lifestyle of people with type 2 diabetes and also people who are at high risk of diabetes could eventually prevent or slow down this progression in this epidemic. So the implementation of more physical activities, cutting down the caloric intake, and addressing all the risk factors that we talked about that could increase the risk of type 2 diabetes could eventually improve the overall health of people living with diabetes, or people living with prediabetes who are at a higher risk of progressing to diabetes. In many countries around the world, there have been diabetes prevention programs implemented, including the United States where the Diabetes Prevention Program has been shown to benefit people with prediabetes. Routine physical activities in the form of walking for at least 30 minutes a day, at least five days a week, along with decreasing caloric intake to promote weight reduction was very beneficial in reducing the risk of progression from

prediabetes to diabetes by about 58% in these individuals. And as I said, many countries around the world try to adopt such diabetes prevention programs and the results have been amazing in that regard. And also for people who are living with diabetes also adopting a healthier lifestyle helps them improve their blood glucose, helps them improve their blood pressure, quality of life, quality of sleep, and it also reduces the risks of various diabetes-related complications, such as kidney disease and mood disorders. And also along the same line of having excellent tools nowadays... so we have some of the best medications and diabetes technology devices nowadays to help people with diabetes manage their disease. And as a result, the proportion of people living with diabetes nowadays who have diabetes-related complications have come down in many parts of the world. And I think this is partly due to these advances in diabetes treatment and technology. Yet, I think we still have more work to do, especially around addressing the accessibility to some of these advanced medications and technology devices, particularly in parts of the world where access to these technologies and medications have been limited.

RK: It certainly is an exciting time, as you mentioned, with all the advances in newer classes of diabetes medications, newer technologies, as well, that are currently available to facilitate the day-to-day management of diabetes. But I agree that in some ways, it might accentuate the inequities that are already present because not everyone can access these newer advances. And I fully agree that it's important to make sure that all these new advances are accessible to everyone who needs them. You know, we talked about lifestyle modification and diabetes prevention, and clearly very important, but often can be harder to implement in practice. And especially as we talk about addressing the global burden of diabetes, I wonder if you can talk a little bit about culturally-specific interventions. You know, how do we address, you know, maybe cultural factors or even dietary factors? Diet ranges so broadly across the world that may impact the rise of diabetes in these parts of the world. I wonder if you could talk a little bit about that, as well.

MA So yeah, so this is a very good question. So and I think it also speaks to the differences between different countries, different racial and ethnic groups when it comes to risk factors for type 2 diabetes, risk factors for obesity. So knowing and realizing these differences would definitely help us approach these people differently as we address the diabetes epidemic. Diabetes prevention programs have to be designed according to the culture that they are implemented within. For example, we've had stories in the Middle East where diabetes prevention program protocols have been tried to be adopted from Western countries, but they have been unsuccessful when it came to the implementation stage. There are definitely differences if you talk about religious backgrounds, cultural backgrounds, the type of food that people like to eat, the time of meals; all these things should be addressed as we implement diabetes prevention programs across countries. And even within the United States, when you talk about implementing diabetes prevention program in Hispanics versus South Asian versus Black individuals, I think there has also to be some element of personalization of these programs.

RK: The patient-centered care does have to be present even in these prevention programs. And I think that example you provided in Middle East is very telling that taking a model of what works in one part of the world may not work the same way in another part of the world and adapting it to the local culture and diet may be very important. I wonder if you could talk a little bit more . . . it's so interesting to hear about the prevention programs in the Middle East and how they might they might be a little bit different... could you talk a little bit more about perhaps the

exercise implementation and the dietary changes? Are they largely similar to those that you might see in other parts of the world with different diets? Or are there different considerations that you have there?

MA I can speak to the Gulf States in the Middle East. One of the things that we've had issues with in the past is the physical activity level of individuals. And I think this has been mostly due to the issues around walkability in neighborhood. And more recently, over the past five to six years, especially in Saudi Arabia where I live, there has been a tremendous move to address walkability in neighborhoods. And there has also been campaigns promoting walking especially during the winter season where the weather tends to be much nicer in this part of the world. So the focus has been really on physical activity, not much on dietary changes. But we definitely are still behind when it comes to implementing diabetes prevention programs at national levels, just similar to what the United States and some other parts of the world have.

RK: Well it sounds like there's much that we can all learn from each other in terms of strategies, challenges, and successes in terms of implementing these prevention programs and different communities and individuals with different needs. You know, I think really adapting the intervention or the implementation of these programs to the needs of an individual really has to be key. So interesting to hear about the walkability campaigns. I think those are clearly very important and very dependent on the weather, too. So it's nice that it's warmer for longer periods of time that people can walk outside. I wonder if there were any other aspects of addressing this global burden of diabetes that you might want to mention in terms of community resources or even the role of caregivers and family?

MA So yeah, what I think we definitely need to do more of as we move forward is spreading the public awareness and recognition of the seriousness of this epidemic. So I think podcasts like this one and websites, like the *Johns Hopkins Patient Guide to Diabetes*, that people can access from anywhere in the world are very powerful tools to raise public awareness about diabetes. And believe it or not, many people are still unaware of the diabetes burden and consequences that we talked about. And many people living with diabetes are in desperate need to be empowered with this knowledge and skills in order for them to manage their disease and prevent its complications. And also for people with without diabetes as we talked about. I think raising the awareness about the importance of these lifestyle modifications to prevent the progression to diabetes is also key in fighting this epidemic and slow it down. We talked about also the accessibility to the amazing advances that we have in diabetes therapeutics and technologies. We need to do more work in this area: addressing the disparity in diabetes care and the potentials for digital divides, especially nowadays as we embrace digital health, is going to be key in shaping our response to the diabetes epidemic moving forward.

RK: Those are all really great points that you raise about ways that we can continue to address this epidemic. For our listeners who are listening out there who might be invigorated to be a part of this advocacy, if you will, or public awareness of diabetes, how might they get more involved in some of the initiatives that you mentioned?

MA In many parts of the world, definitely here in the Middle East, we do have a lot of patient support groups where patients can be part of this move in supporting other patients with

diabetes. We also do have educational online platforms where we provide patients with training and around skills that they need to manage their disease on a daily basis. A lot of our patients who attend these activities usually end up being trainers themselves and train other patients. So I think that community of diabetes has been doing tremendous work and spreading the awareness among their relatives, their friends, and I think we could always benefit from this as healthcare professionals, as well as the community.

RK: Well, thanks so much, Dr. Al-Sofiani for being here and sharing with us the global epidemic of diabetes – why it's rising, and what can be done, and really just emphasizing that we really are a global community. And we've learned so much and are so glad to have you here on our podcast. Thanks again for being here.

MA Thank you very much for having me. It's been fun.

RK: I'm Dr. Rita Kalyani, and you've been listening to *Diabetes Deconstructed*, a companion podcast to the *Johns Hopkins Patient Guide to Diabetes* website. For more information, visit hopkinsdiabetesinfo.org.

We love to hear from our listeners. The email address is hopkinsdiabetesinfo@jhmi.edu. Thanks for listening. Be well and see you next time.