

# Analogy-based education improves glycemic control in diabetic patients with hyperglycemia

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Diabetic patients receive standard-of-care treatment when they receive their diagnosis. This includes visiting their primary care doctors and

learning about the disease and why and how they need to care for themselves by attending formal diabetes education provided by certified diabetes educators and nutritionists. If a patient's diabetes does not improve, they are referred to a specialist. However, a diabetes specialist at Baylor College of Medicine learned over time that many of his patients often did not understand basic concepts of diabetes, despite receiving usual care, so he developed an educational approach known as Analogy-Based Comprehensive Diabetes Education (ABCDE) using easy to understand language. The findings from this retrospective study are published in *Healthcare*.

"This did not begin as a research project, but it was an attempt on my part to overcome a clinical barrier toward providing more effective and meaningful [diabetes](#) education," said Dr. Rajagopal Sekhar , associate professor in the Margaret M. and Albert B. Alkek Department of Medicine in the Section of Endocrinology, Diabetes and Metabolism at Baylor. "It began in [small steps](#), but was so well received by patients that I thought, 'How can I report this clinical outcome in a paper so I can let healthcare providers know of an alternate and effective form of diabetes communication?'"

Diabetes patients in underserved populations often face economic, racial, ethnic and linguistic barriers, leading them to feel overwhelmed and struggle to understand the importance of their diagnosis. Because standard diabetes education can be unclear for patients, they often fail to follow the important steps in improving their overall health, which includes monitoring and maintaining good levels of hemoglobin A1c (HbA1c) and focusing on a healthy diet with avoidance of sugary beverages and fast food.

Sekhar developed the novel ABCDE approach to educate patients about these foundational concepts of diabetes care. Diabetes education includes teaching the importance of taking medications, following a

healthy diet, regular exercise, annual retinal eye exams and monitoring hemoglobin A1c. He uses multiple diverse analogies to effectively communicate concepts of diabetes to his patients attending his diabetes clinic for underserved HIV patients in Houston.

## **The speedometer analogy**

One analogy that resonated with patients for understanding hemoglobin A1c was the "speedometer analogy," where he compares diabetes to a car to explain the HbA1c test in a more relatable manner.

"The concept of the HbA1c test is a little abstract" Sekhar said.

"Explaining that HbA1c is an averaged sugar value over a 3-month period is how most physicians and educators present it to patients, but it is hard to relate to and respond to, and many patients do not grasp or appreciate the critical difference between a good value of 7% or a dangerously high value."

He tells his patients: pretend that diabetes is a car. The speedometer of your diabetes car is the A1c test, which tells you how fast your diabetes is moving. A good value of your diabetes test is a value of 7%. If your HbA1c test result is a value of 7%, it is like you're driving 20 miles per hour in a school zone, a completely safe driving speed.

If your A1c number is 8%, then it is one point above normal. Each point of the A1c is like an extra 20 miles per hour. If a patient's A1c is at 14%, they would be driving at 160 miles per hour. Just like anyone stepping in front of your car while speeding at 160 miles per hour could get seriously hurt, your speeding diabetes car will hurt your eyes, kidneys, feet, heart and brain if you do not slow down and lower your HbA1c to safer levels.

This is why diabetes remains a leading cause of blindness, amputations,

kidney failure, heart attacks and strokes. This style of messaging resonates powerfully with patients, and the response is immediate in terms of improving self-care, Sekhar explained.

## **The chair analogy**

Sekhar uses the "chair analogy" to explain the basic components of diabetes care, such a healthy diet, daily exercise and being adherent to diabetes medications. A real chair needs four strong legs for stability, and if a single leg is broken, the chair falls. Similarly, good diabetes control is supported by four legs, and if any are broken, the diabetes is not well-controlled. He explains that these legs of the diabetes chair:

- First leg: everything you drink should be healthy. Mainly drink water, avoiding sugary beverages.
- Second leg: you should be eating healthy.
- Third leg: physical activity and exercise under medical advice and common sense.
- Fourth leg: take diabetic medication as prescribed.

Just like a chair cannot stand on one leg alone, trying to manage diabetes by taking medication alone and ignoring healthy food, drink and exercise routines will not improve diabetes.

"I merge these analogies into diabetes education. Once my patients understand these fundamental concepts, the medical advice is always very well received. I can see the light of recognition and connection in their faces and many of my patients have shared afterward that they understood diabetes much better with the ABCDE approach," Sekhar said. "The results were amazing with very significant improvements in attitude, behavior and enthusiasm toward diabetes self-care, which translated to improved glycemic control."

## Lessons from the study

In the retrospective study, Sekhar reports his experience with 24 diabetic patients (12 women and 12 men) who were referred to him for uncontrolled diabetes. These patients already had received usual care and were prescribed medications, but they were missing doses and not taking them daily. They also were not following a [healthy diet](#). He did not change their medication, prescribe new medication or change the dose of medication, but instead provided the ABCDE approach to help them understand the importance of diet, exercise and medication adherence. When these patients returned three months later, he saw an obvious decrease in their blood sugar values, and his patients expressed feeling better with greater hope and enthusiasm. He noticed a continued decline in these diabetes results even at their second visit, which occurred six months after they first received the ABCDE approach.

"When the numbers start getting better, it translates to them appreciating how well they feel. They notice they are urinating less during the day and not waking up several times at night to urinate, and they have more energy and feel much better overall. They connect these improvements to better self-care and identify the ABCDE as the main reason for their behavioral change. They want to take better care of themselves," Sekhar said.

## The three Es

He emphasizes the importance of diabetes education with an approach he calls 'the three Es':

- Educate: every diabetic patient needs to be properly educated to a point that they understand their own diabetes
- Encourage: let patients know they can do it and help them

overcome frustration with diabetes

- Empower: help patients take care of their own diabetes

Sekhar says that he is not trying to reinvent the wheel. He believes that the basic concepts of diabetes, which are already available in diabetes education classes, are appropriate and adequate. He is using different language with the ABCDE approach to communicate these concepts to patients. Moving forward, Sekhar hopes to obtain funding to conduct a prospective clinical trial in collaboration with behavioral psychologists and other professionals involved in behavioral modification research.

## Next steps

"The next step is to conduct a prospective study with new [diabetic patients](#) where one group will receive both traditional diabetes education and the ABCDE approach, while another group will receive only traditional diabetes education without ABCDE, to evaluate if providing this approach makes a difference in achieving glycemic goals," he said.

He hopes for this to be an easily accessible teaching tool that providers can employ in their own clinics.

"In my experience, a lot of patients struggle to understand these simple and basic concepts. Finding simple language to explain it in a way that leads to better understanding is very helpful to patients," Sekhar said. "I am continually developing newer analogies to explain more detailed concepts of diabetes such as beta-cell function, insulin resistance, why insulin injections need to be started, how diabetic medications work and more."

This publication is a retrospective analysis of the impact of the ABCDE approach of diabetes education on glycemic outcomes developed by Sekhar for patients attending his diabetes clinic.

**More information:** Rajagopal V. Sekhar, 'Analogy-Based Comprehensive Diabetes Education' (ABCDE) Improves Glycemic Control of Diabetic Patients in an Underserved Population: Results of a Retrospective Chart Analysis, *Healthcare* (2022). [DOI: 10.3390/healthcare10030409](https://doi.org/10.3390/healthcare10030409)

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