World Diabetes Day Focuses on the Growing Health Threat of Diabetes

Chris Triggle, PhD
Professor of Pharmacology
Weill Cornell Medical College in Qatar

November 14th is designated as World Diabetes Day by the International Diabetes Federation and the World Health Organization as a way to focus attention on diabetes and its escalating threat to health around the world.

Chris Triggle, PhD, is professor of pharmacology at Weill Cornell Medical College in Qatar. He is known internationally for his research on diabetes and its effect on blood vessels that can result in blindness, limb amputations, kidney failure and, especially, heart disease. He addresses some key questions about diabetes, its effect on health and some ways to prevent and treat it.

Q: Why should we be concerned about diabetes?

A: Diabetes has been classified by the World Health Organisation (WHO) as a pandemic and cases of diabetes are expected to double to 300 million by 2025. It is the only noninfectious disease to be classified as a pandemic. In the next decade, the number of lives lost to diabetes, primarily as a result of cardiovascular disease, is predicted to increase by a 25 percent and could cause the first reduction in life expectancy reduction in more than 200 years. Diabetes is a killer disease and we should be very concerned about this pandemic.

Q: What exactly is diabetes?

A: Diabetes is characterized by abnormally high blood sugar or glucose. The inability to properly regulate blood sugar means the tissues of the body are starved of sugar, a key supplier of “fuel” to the body, and must use other energy sources.

There are two main types of the disorder.

**Type 1** diabetes was once seen most often in children and was commonly called juvenile diabetes. In fact, it also develops in adults. Type 1 diabetes results when the cells in the pancreas stop making enough insulin, a hormone released in response to a meal that is responsible for facilitating glucose uptake into the tissues of the body. If insufficient insulin is released, then blood glucose levels remain high and can damage the body – particularly the blood vessels and the heart. Because Type 1 diabetes is treated by providing insulin, commonly in the form of an injection, it has also been referred to as Insulin-Dependent Diabetes (IDDM). We do not fully understand why people develop Type 1 diabetes. We believe it results when the immune system starts to destroy the insulin-secreting cells in the pancreas a Type of autoimmune disease. A prior viral infection may trigger this, but there also seems to be genetic components, too, as the incidence of Type 1 diabetes is more common in some families and genetic links have been reported.

**Type 2** diabetes was once most common in adults and therefore was called “Adult-Onset Diabetes.” Type 2 diabetes develops when the body becomes resistant to the effects of insulin – this is termed insulin resistance. Since insulin is still produce by the body, this form of diabetes is called Non-Insulin-Dependent Diabetes (NIDDM). Initially the body responds by producing more insulin. Eventually the insulin-secreting cells in the pancreas become less effective and insulin levels begin to fall somewhat like Type 1 diabetes, though the causes of Type 1 and Type 2 are quite different. Type 2 diabetes is treated with drugs that help overcome insulin resistance. Eventually patients with Type 2 diabetes may require insulin injections, too.
Another concern is the increase in the incidence of “Gestational Diabetes” occurring in pregnant women who were not previously diabetic. As a world-wide average, gestational diabetes currently affects about 5 percent of all pregnant women, but the incidence is higher in societies where obesity and diabetes are also higher. The concern is that women with gestational diabetes have a greater risk of developing diabetes, usually Type 2 diabetes, later in life and their children, too, are more likely to be overweight and develop diabetes later in life.

Q: Why has there been such a large worldwide increase in the incidence of diabetes?

A: The incidence of both Type 1 and Type 2 diabetes has increased in recent decades. The majority, more than 90 percent, of the people diagnosed with diabetes, have Type 2 diabetes. The increase in the diagnosis of Type 2 diabetes in children and adolescents is a particular concern.

To a great extent, the increase in the incidence of Type 2 diabetes results from higher standards of living, changes in eating habits and more sedentary lifestyles combined with a variable genetic pre-disposition. The introduction and spread of high sugar drinks and high-calorie, fast foods, including refined carbohydrates that result in a rapid increase in blood sugar levels, is a serious contributing factor to the problem. In other words, when food intake far exceeds energy needs, the body starts to accumulate fat and that causes other metabolic changes that collectively can result in the development of resistance to the effects of insulin and the resultant development of Type 2 diabetes.

There also is a genetic component to the development of Type 2 diabetes, with some populations considerably more susceptible to developing the disease. The overall incidence in the Gulf States is very high, with close to 20% of the population affected.

Q: What can be done to prevent this increase in diabetes – particularly Type 2 diabetes?

A: Life style changes that focus on nutrition and exercise have been shown to be effective in decreasing the incidence and slowing the development of Type 2 diabetes in populations. However, maintaining a healthy lifestyle is difficult; and for many people, it requires a commitment from not only the individual but also from the entire family.

Maintaining an active lifestyle wherever possible is a very good strategy and should be encouraged at all levels. Moderate exercise improves blood flow and has also been shown to result in changes that help protect the blood vessel against the bad effects of blood sugar.

Q. How do people know if they have diabetes?

A: People with very high levels of glucose in the blood may urinate more frequently and may develop an excessive thirst for more fluids. They should seek medical advice to determine if they do indeed have diabetes. Diabetes can be readily diagnosed by a visit to a clinic and the analysis of a blood sample following overnight fasting. There are additional tests, such as an Oral glucose tolerance test (OGTT) where, after fasting, people take glucose by mouth and their blood levels of glucose are assessed to determine how well the body removes the glucose from the blood.

Q: What about diagnosis and treatment for diabetes? Have there been any major advances?

A: Yes, indeed there has been considerable progress in management and treatment options for diabetes. Great emphasis is placed on educating patients about the disorder because of the importance of diet and regular monitoring of blood glucose levels, which helps them monitor the effectiveness of treatment. Several new drugs have been introduced for the treatment of Type 2 diabetes. For patients with Type 1 diabetes, there are new formulations of insulin and ways to administer it. Techniques for transplanting the cells that make insulin and the entire pancreas and stem cell technology are being explored as potential sources of treatment.
Q: How does your research relate to the diagnosis and treatment of diabetes?

A: With a grant from Qatar Foundation’s National Priorities Research Program, my colleague Dr. Hong Ding at WCMC-Q, and I are working with colleagues in the USA and Canada to understand how glucose damages blood vessels. So far, we know that even a brief exposure to high glucose can damage the inner layer of blood vessels. This causes the development of “glycemic memory,” – which means the damaged blood vessel remembers the harm even though glucose levels may have returned to normal. Blood vessel disease may develop at a later date. Understanding the way changes in glucose levels injure the blood vessel will help identify more effective preventive and treatment options.

The medical information in this article is provided as an information resource only, and is not to be used or relied on for any diagnostic or treatment purposes. This information is not intended to be patient education, does not create any patient-physician relationship, and should not be used as a substitute for professional diagnosis and treatment. If you have or suspect that you have a medical problem or condition, please contact your physician.