SPONSOR CONTENT

Type 1 diabetes

STUDY

Improving the chances for healthy pregnancies

When Erin Johnstone heard about a study testing the benefits of continuous glucose monitoring technology in pregnancy, she eagerly signed up. The 29-year-old Calgary mother with type 1 diabetes said she had two reasons for wanting to participate – to advance diabetes research and to carefully monitor her blood sugar levels during her third pregnancy.

Both Erin and her husband Chris live with type 1 diabetes (T1D), an autoimmune disease that makes them insulin-dependent for life. From the time of her diagnosis in 2003 until her participation in the study, Erin managed her diabetes with regular "finger pricks to test her blood sugar levels" and insulin injections.

"I always try to know what my blood sugar level is – I'm very careful that way," Erin explains, adding that she typically tested a minimum of six times a day, before meals and bedtime, as well as when she felt her levels might be out of balance. Erin adds she has an easier time getting a good A1C – a measure of the body's blood glucose levels – compared to other people with T1D like her husband, for example, since her pancreas produces a very small amount of insulin.

Keeping an eye on her blood sugar levels became even more important during her pregnancies since poor glycemic control can result in a number of serious complications, says Erin. Expectant mothers with T1D have a higher incidence of elevated blood pressure and preterm births, while their babies are at increased risk for congenital malformations and neonatal care unit admissions. Since the babies can be significantly larger than average, delivery complications are also more common.

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>
> **Erin Johnstone**
> is living with with type 1 diabetes

Erin Johnstone and her husband Chris are both living with type 1 diabetes. They know how important it is to keep their blood sugar levels within a normal range. Glycemic control can be especially challenging during pregnancy and can affect the health of both mother and baby. SUPPLIED

While Erin diligently checked her blood sugar levels when she was pregnant with both her son Ewan (4) and her daughter Eilidh (2), the birth of her second child proved more challenging.

Eilidh's birth weight of nine pounds, five ounces made the delivery difficult. "At one point, the doctor asked one of the nurses to start counting because the baby had gotten stuck for so long they were getting worried," says Erin. She explains that the physician was concerned about the reduced amount of oxygenated blood reaching the baby due to shoulder dystocia. Erin believes this wouldn't have happened if she "hadn't been diabetic or had better glycemic control during that pregnancy."

Luckily, Eilidh suffered no permanent damage. But when Erin got pregnant with her youngest daughter Peyten (now four months old), she aimed for better control and signed up for the JDRF Canadian Clinical Trial Network's (JDRF CCTN) Continuous Glucose Monitoring in Women with Type 1 Diabetes in Pregnancy Trial (CONCEPTT).

As part of the study, Erin was assigned to wear a Medtronic CGM device and found it made monitoring her blood glucose levels easier. "The CGM system includes a sensor on your body that gives you a reading every five minutes. It also alerts you when your levels are trending up or down, so you know when you need to eat something or take insulin," she says.

Another benefit included tracking blood glucose levels while she was sleeping, says Erin. "Overnight blood sugars can greatly affect the size of the baby. Without the sensor, you don't know what your levels are unless you wake up to check. Having the sensor, I was able to monitor my blood sugars during the night and adjust my insulin," she says, adding that an alarm when blood glucose levels go dangerously low at night can save lives.

Erin partly attributes Peyten's healthy birth weight of seven pounds, six ounces to the added glycemic control the CGM system offered. And even though her participation in the trial has ended, Erin continues using the technology since "the information it provides makes controlling blood sugar levels a lot easier.

"And because of the study, my husband also started using a CGM device," says Erin. "It used to be quite challenging for him to control his blood sugar, but his A1C has improved dramatically since he started wearing the sensor."

ABOUT JDRF

JDRF IMPROVING LIVES. CURING TYPE 1 DIABETES.

JDRF is the leading global organization focused on type 1 diabetes (T1D) research and the largest charitable funder and advocate for T1D research with the mission to find a cure for diabetes and its complications.

Driven by passionate, grassroots volunteers, JDRF is committed to improving the lives of people affected by T1D by accelerating progress on the most promising opportunities for curing, better treating and preventing the disease. JDRF continuously strives to help people at all ages and all stages of T1D live better, longer, healthier lives.

Through local chapters, international affiliates, volunteers, staff and corporate partnerships in over 100 locations worldwide, JDRF offers a diverse support network, outreach programs, advocacy initiatives and innovative fundraising programs.

More information at jdrf.ca.

ADVANCES

Study participants gain access to education and new technology

Managing type 1 diabetes is not easy, especially during pregnancy, and improved glycemic control – keeping blood glucose levels within a tight range – has been linked to better pregnancy outcomes for both mothers and babies. "Hats off to the women – they work incredibly hard to have healthy babies," says Lois Donovan, medical director of diabetes in pregnancy in the Calgary zone of Alberta Health Services.

Dr. Donovan says she dreams of the day when major advances in therapies will ease the way for pregnant women with type 1 diabetes (T1D). She also supports steps in that direction and has taken on the role of principal investigator of the Calgary arm of the JDRF Canadian Clinical Trial Network Continuous Glucose Monitoring in Women with Type 1 Diabetes in Pregnancy Trial (CONCEPTT).

CONCEPTT is the first large-scale international trial that evaluates the benefit of adding a real-time continuous glucose monitoring (CGM) sensor to standard therapy. A CGM system consists of a small sensor inserted in the skin that transmits blood sugar readings every five minutes to a monitor similar to a pager, says Dr. Donovan.

Only one of the two randomized groups in the study utilizes CGM technology in combination with traditional monitoring, but Dr. Donovan sees participation as a "win-win for all participants, since both groups learn a lot about diabetes and pregnancy."

Although trial results are not available yet, she has already noticed benefits. "Being part of CONCEPTT has given our centre the opportunity to get more experience with continuous glucose sensors," she explains.

Dr. Donovan works closely with Denice Feig, head of the diabetes and endocrinology in pregnancy program at Mount Sinai Hospital, Toronto, and Helen Murphy in Cambridge, U.K., who are co-principal investigators overseeing Canadian and international sites.

Dr. Murphy, senior research associate at the University of Cambridge's metabolic research laboratories, sees the trial as a very timely addition to diabetes research.

Of the two cohorts participating in the trial – women who are planning pregnancy and expectant mothers – she says they are "very motivated to do everything within their power to get as much blood sugar control as possible." This motivation already improves the odds for study participants, says Dr. Murphy, who believes making CGM technology available to a "good range of women" is another important aspect of CONCEPTT.

One group of expectant mothers participating in the CONCEPTT study had access to continuous glucose monitoring technology that relays information about blood glucose levels every five minutes. SUPPLIED

Among her patients, for example, was a Roma woman with extremely low literacy levels who – although she didn't know the numbers – was able to read the monitor and "did phenomenally well, delivering a healthy baby," says Dr. Murphy.

This is an example where an expectant mother greatly benefited from having access to a CGM system, Dr. Murphy explains, adding that another trial participant expressed the sentiment that after using a CGM, regular blood glucose monitoring felt like "driving a car with a blindfold."

Dr. Murphy hopes the outcomes of the study "will help to get the devices to all eligible candidates."

Dr. Donovan says the sharing of data and advice has not only helped her caring for the study participants, but has also informed her larger practice. The support available to women with diabetes includes access to an endocrinologist, a diabetes nurse and a dietician, explains Dr. Donovan. "Managing diabetes and pregnancy is a real team effort, and the person who works the hardest is the mother," she says.

Online? Visit jdrf.ca for more information.

FUNDING

Creating a pan-Canadian network of support

Type 1 diabetes – a non-preventable autoimmune disease in which the body's immune system attacks and destroys the insulin-producing cells of the pancreas – can strike children and adults suddenly, leaving them insulin-dependent for life. More than 300,000 Canadian children, adolescents and adults live with type 1 diabetes (T1D), and this number is increasing by three to five per cent annually.

"Managing T1D is a daily challenge. This disease is with you for life, and the obstacles that come with it never take a break," says Dave Prowten, Canada's president and CEO of JDRF, an organization dedicated to T1D research funding and advocacy.

Prowten explains that to accelerate solutions for the management, care and cure of T1D, the JDRF Canadian Clinical Trial Network (JDRF CCTN) is currently conducting several high-profile clinical trials in association with leading diabetes researchers at partner universities and medical centres, and is ready to scale up its efforts nationally to benefit all Canadians.

JDRF CCTN has received support from the Government of Canada in 2009, through the Federal Economic Development Agency for Southern Ontario (FedDev Ontario). "Our government is proud to have contributed $20-million to establishing JDRF's extensive Canadian Clinical Trial Network based here in southern Ontario," says the Honourable Gary Goodyear, Minister of State for FedDev Ontario.

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> **Gary Goodyear**
> is Minister of State for FedDev Ontario

"This network supports the co-ordination of global research and enables the clinical testing of new technologies for better treatment and prevention of the effects of type 1 diabetes. These types of activities not only help those living with type 1 diabetes, but also put southern Ontario on the map as a destination for medical research and innovation, thereby creating hundreds of knowledge-based jobs through the region," he adds.

With a total of $33.9-million in funding, CCTN has demonstrated remarkable benefits and capabilities in innovative research. This includes operating nine peer-reviewed clinical trials in Ontario plus one technology project, and creating over 200 highly-skilled, knowledge-based jobs across leading hospitals, academic, medical and health science centres and industry. In addition, nearly 1,000 Canadians with T1D have gained early access to life-enhancing technologies or solutions through clinical trials.

As a result of the Government of Canada's investment, Canada is now home to a significantly larger portion of JDRF's funding for global trials. "Through the trials, we are positioning Canada as an international hub for diabetes science and innovation, and have significantly contributed to our country's clinical trial infrastructure," says Prowten, adding that CCTN's success has led to new scientific partnerships, including international collaboration with researchers in Israel, U.K., U.S. and Australia.