



**Gestational Diabetes and First Nations Women**  
**A literature review**

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## **Gestational Diabetes and First Nations Women**

### **Diabetes**

Diabetes is a disease in which the body is unable to use sugar (or glucose) resulting in too much sugar in the blood (hyperglycemia). There are three types of diabetes: type 1 (insulin dependent), type 2 (non-insulin dependent diabetes mellitus (NIDDM) or “adult onset”), and gestational diabetes mellitus (GDM). With type 1 diabetes, the body does not make insulin (the hormone required to break down sugar) so sugar builds up in the body (CDA, 2005-2009b). People with type 2 diabetes either do not produce enough insulin or their bodies cannot use the insulin it produces correctly (CDA, 2005-2009c).

Diabetes was not a well known disease among First Nations people in the past. While type 1 diabetes is still rare for First Nations, type 2 diabetes has become very common (Health Canada, 2001). Similarly, Indigenous Peoples worldwide have higher rates of diabetes. However, regardless of where they live, about 90% of people with diabetes have type 2 diabetes. The rate of type 2 diabetes for the First Nation population is about three to five times higher than the average rate for the general Canadian population. Reports indicate that up to one in four First Nation individuals over the age of 45 living on-reserve has diabetes with the prevalence rate reaching almost 20% for First Nations adults (Health Canada, 2001; Assembly of First Nations, 2007). Diabetes rates seem to be higher among First Nations women than men and people living on-reserve than off-reserve (Health Canada, 2001). Type 2 diabetes occurs at a younger age for First Nations people than for other populations in Canada. In general, there are higher rates of complications, greater severity at diagnosis, and lack of services for the First Nations population (Health Canada, 2001).

Diabetes places a burden on individual health and the health care system. It is also associated with a range of complications ranging from heart disease to eye disease (CDA, 2005-2009a). First Nation diabetics suffer more health consequences from their diabetes and have more activity limitations than others in Canada who have the same disease (AFN, 2007). Unfortunately, only about 40% of First Nations type 2 diabetics are estimated to have attended a diabetes clinic or have received diabetes education, with only about half of them monitoring their glucose intake every day (AFN, 2007).

## Gestational Diabetes Mellitus

In addition to types 1 and 2, a third type of diabetes exists which affects only women and is called gestational diabetes mellitus (GDM). GDM is a temporary type of diabetes that occurs during pregnancy. Most women with GDM will return to normal glucose levels after delivery of the baby. If a woman does not return to normal glucose levels she will be re-diagnosed with type 2 diabetes and will no longer be considered to have GDM (Smith-Morris, 2005, p. 148). In some cases this may mean that glucose intolerance began before pregnancy but was only diagnosed during pregnancy (Berger, Crane, & Farine, 2002, p. 3). In some communities, women are screened for GDM before they are screened for type 2 diabetes. For this reason some women are unaware of their diabetic status until they have GDM that does not go away after the delivery of their baby. In general, GDM occurs in 2% to 4% of all pregnancies in Canada (Health Canada, 2001). However, rates for First Nations women have been reported to range from 8% up to 18% (Canadian Diabetes Association, 2005-2009a). According to the 2002-2003 Regional Health Survey, one in eight First Nations women reported having gestational diabetes (First Nations Centre, 2005, p. 71). Heavier women are at greater risk for developing gestational and type 2 diabetes. Women who have had GDM and their infants are at increased risk of developing type 2 diabetes, with the infants further at risk of and having high birth weight (AFN, 2007). Babies born with a high birth weight are at increased risk of developing diabetes even if the mother did not have diabetes.

First Nations women are at increased risk of developing GDM and rates of GDM among Native groups in North America are on the rise (Rodrigues et al., 2000, p. 806). First Nations ancestry is considered to be an independent risk factor for GDM (Dyck et al., 2002, p. 491). This means that even without any of the other risk factors listed below, women with First Nations ancestry are more likely to develop GDM. The reasons for this are unclear. Other risk factors for developing GDM include:

- a previous diagnosis of GDM during an earlier pregnancy;
- family history of diabetes;
- previous delivery of a heavy or 'high birth weight' baby (weighing over 4000 grams or 8 pounds, 13 ounces)
- age – the risk for GDM increases with age and is highest for women 35 years old and older;
- obesity (measured as Body Mass Index (BMI) over 30 kg/m<sup>2</sup>);
- polyhydramnios (too much amniotic fluid in the womb);

- use of corticosteroids (i.e. drugs used for arthritis);
- previous unexplained stillbirth;
- history of polycystic ovary syndrome; and
- acanthosis nigricans (disorder in which there are darkened patches of skin) (CDA, 2005-2009a; Berger, Crane, & Farine, 2002, p. 5; Godwin et al., 1999, p. 1301).

Being obese or overweight before pregnancy and gaining excessive weight during pregnancy can also increase the risk of gestational diabetes. Research has shown that both pre-gestational diabetes and gestational diabetes contribute to the high prevalence of diabetes in First Nations populations. This pattern is also seen in non-First Nations populations (Oster & Toth, 2009, p. 4).

## **Effects of Gestational Diabetes**

Gestational diabetes creates risks for both the mother and the baby (Harris et al., 1997, p. 1422). These risks vary from additional stress on the mother and baby during delivery to the development of type 2 diabetes later in life. GDM is a temporary condition that can have long-term effects.

### ***Effects of GDM on the Mother***

- Women with GDM are at risk of delivering a heavy (high birth weight) baby which can lead to increases in birth trauma and may increase the need for caesarian section delivery (Brennand et al., 2005, p. 936; Harris et al., 1997, p. 1422).
- Women who have had GDM are at increased risk of developing type 2 diabetes (CDA, 2005-2009a; Rodrigues et al., 1999b p.1293).
- Up to 70% of First Nations women with GDM in their first pregnancy will develop type 2 diabetes later on compared to about 40% of non-First Nations women. (Berger, Crane, & Farine, 2002, p. 4).
- Some studies have found that Aboriginal women with GDM are more likely to have high blood pressure during pregnancy (Dyck et al., 2002, p. 491).
- There has not been enough research to determine if treating GDM can reduce the risk of type 2 diabetes later in life. A diagnosis of GDM may mean that a woman is more carefully monitored and allows for earlier detection of and treatment for type 2 diabetes (Berger, Crane, & Farine, 2002, p. 4).

### ***Effects of GDM on the Infant***

- Gestational diabetes can cause the baby to have a high birth weight (Harris et al., 1997, p. 1422). High birth weight is considered to be a baby weighing more than 4000 grams at birth (or 8 pounds, 13 ounces).
- Infants born to mothers with GDM have three times the risk of shoulder dystocia which can cause temporary or permanent nerve damage in the shoulder (Berger, Crane, & Farine, 2002, p. 4). Shoulder dystocia occurs when the baby's shoulder gets stuck behind the mother's pubic bone.
- Newborns born to a mother with GDM are at increased risk for dangerously low blood sugar levels (hypoglycemia) after birth, excessive blood insulin levels (hyperinsulinemia), low levels of calcium in the blood (hypocalcemia), too many red blood cells (polycythemia), and yellowing of the skin and eyes (jaundice caused by hyperbilirubinemia ) (CDA, 2005-2009a; Harris et al., 1997, p. 1422).
- Babies born to mothers with GDM are at greater risk of becoming obese and having long-term glucose intolerance or developing early onset type 2 diabetes (CDA, 2005-2009a; Harris et al., 1997, p. 1422; Dyck et al., 2002, p. 487).

### **Gestational Diabetes and First Nations Women**

There has been some research on gestational diabetes in First Nations populations. Some of the research findings on GDM and First Nation are that:

- GDM rates are increasing and are much higher for First Nations women than other women in Canada (Berger, Crane, & Farine, 2007, p. 4; Aljohani et al., 2008, p. E133).
- The rate of GDM for First Nations women in certain communities in Saskatchewan, Manitoba, Quebec, and Ontario ranges from 9% up to 13% and are up to 4 times higher than the rate for non-First Nations women (Aljohani et al., 2008, p. E133; Caulfield et al., 1998, p. 300; Godwin et al., 1999, p. 1301; Rodrigues et al., 1999b, p. 1295).
- Within the Saskatoon Health District, about 4% of pregnant non-Aboriginal women had GDM and about 6% of Aboriginal women. Outside of the health district, the number of non-Aboriginal pregnant women was lower but almost 23% of Aboriginal women (or about one in four) had GDM (Dyck et al., 2002, p. 488). This means that

Aboriginal women living outside the Saskatoon Health District were over nine times more likely to have GDM.

- GDM is more common for First Nations women in rural areas than urban areas, for women from more accessible communities than less accessible communities, and for women from inland versus coastal communities (Aljohani et al., 2008, p. E135; Dyck, Tan, & Hoepfner, 1995; Dyck et al., 2002, 487; Rodrigues et al., 1999b, p. 1296).
- A study in Alberta found that rural First Nations women had more risk factors for GDM, including higher blood sugar levels, higher rates of obesity, greater waist circumferences, and higher rates of self-reported GDM (Oster & Toth, 2009, p. 4).
- Where a woman lives affects their risk of developing GDM. This is probably due to lifestyle and diet differences in urban, rural, and isolated settings (Dyck, Tan, & Hoepfner, 1995; Rodrigues et al., 1999b, p. 1296).
- Normal weight Cree women have been found to have similar GDM rates as non-First Nations women but obese Cree women are at twice the risk than obese non-First Nations women (Rodrigues et al., 1999a, p. 1085). About 15% of Cree women who were overweight before pregnancy had GDM and over 27% of obese women (Brennand et al., 2005, p. 940).
- About half of First Nations women diagnosed with GDM in a one pregnancy are diagnosed in subsequent pregnancies (Aljohani et al., 2008, p. E134; Harris et al., 1997, p. 1423).
- Up to 70% of First Nations women with GDM will develop type 2 diabetes later in their life (Berger, Crane, & Farine, 2007, p. 4).

Studies find that GDM is more common in First Nations populations than the general Canadian and North American populations. Since GDM is a risk factor for the development of type 2 diabetes, the high rates of GDM may be contributing to the high rates of type 2 diabetes among the First Nations population (Dyck et al., 2002, p. 492).

## **Conclusions**

Type 2 diabetes has become very common among the First Nations population and Aboriginal ancestry has been identified as an independent risk factor (Health Canada, 2001; Dyck et al., 2002, p. 491). Diabetes is an important health issue for all First Nations communities. Canadian studies have found rates of GDM in First Nations communities ranging from 8.5% to 27%. This is much higher than the Canadian Diabetes Association's

statistic that GDM affects 3.7% of the non-Aboriginal population and 8% to 18% of the Aboriginal population. GDM increases the risk of developing type 2 diabetes.

Understanding how to prevent and manage GDM is important in the fight against diabetes. The risk of GDM is higher for overweight and obese women. Due to traditional cycles of feasting and fasting, and active lifestyles, First Nations people may be genetically predisposed to diabetes because of better energy storing (Health Canada, 2001). The adoption of western, less active lifestyles including diets higher in calories, fat, and sugar have led to increases in obesity rates among First Nations people, as well as increases in the rates of type 2 and gestational diabetes.

Additionally, the foods eaten by First Nations women have changed over time. The younger generations depend on food that can be purchased at the local store. Unfortunately, these foods are generally higher fat items with less nutritional value (Gray-Donald et al., 2000, p. 1249). These changes have led to increasing obesity and diabetes rates. Studies have identified a greater risk of obesity and GDM in communities that are more accessible and therefore in greater contact with modern diets. It seems that communities that have kept a more traditional diet are protected from GDM and communities that have adapted non-Traditional diets and reduced exercise levels are dealing with increases in GDM and obesity rates (Dyck, Tan, & Hoepfner, 1995).

First Nations and other Aboriginal people in Canada who have maintained more traditional lifestyles have very low rates of diabetes (Rodrigues et al., 1999a, p. 1087). These groups have lifestyles which include hard physical work. Even a small amount of energy spent on hunting and trapping in bush camps has been found to decrease the amount of sugar in the blood for diabetic Cree men and women (Rodrigues et al., 1999a, p. 1087).

The rise in type 2 diabetes among First Nations and other Aboriginal Peoples worldwide presents a challenge to communities and health systems across the globe. Indigenous groups have some of the highest rates of diabetes and gestational diabetes around the world. This makes it difficult to determine the specific factors involved in gestational diabetes for First Nations women in Canada.



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