Healthy Weights CONNECTION™

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Type II Diabetes: Aboriginal Children and Youth in Canada

Fact Sheet No. 6

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Introduction

Purpose: This fact sheet was developed to inform service providers about the basic physiology, risk factors and treatments relating to children and youth who may have type II diabetes, and the implications of program development for these children and youth.

Insulin and Glucose Levels in the body: Insulin is a hormone that is produced and secreted by the pancreas. It acts on cells in the body, along with other hormones, to maintain blood glucose at a relatively stable level. To this effect, insulin counteracts a rise in blood glucose by suppressing the breakdown of fats and carbohydrates that are stored in the liver, and by increasing glucose uptake in places such as muscle cells and liver cells[2]. The resulting relationship is that as insulin rises, blood glucose falls.

Diabetes Mellitus

Diabetes mellitus is characterized as having elevated blood sugar levels, and is further differentiated into type I and type II groups. *Type I* diabetes, usually diagnosed in childhood, is an abnormal immune response of the body (autoimmune disorder) that destroys pancreatic cells which normally secrete insulin[4]. *Type II* diabetes, usually diagnosed in adulthood, involves insufficient insulin secretion and/or resistance to insulin[3]. This fact sheet focuses on Type II diabetes in Aboriginal children and youth.

Type II diabetes, also referred to as adult onset diabetes or non-insulin dependent diabetes, comprises 90-95% of people with diabetes[3]. Although initially only seen in the adult population, the incidence of type II diabetes in youth has been on the rise. Type II diabetes is a condition where blood glucose is higher than a critical point and where the cause of the high blood glucose is not due autoimmune destruction of pancreatic cells[3]. Researchers believe that risk factors for type II diabetes include: obesity, diet, genetics, lack of physical activity, social determinants of health, in-utero exposure to diabetes [5], diabetes in a first- or second-degree relative, impaired glucose tolerance, polycystic ovary syndrome, and a condition associated with insulin resistance[6,7].

Obesity, diet and exercise. Obesity is the most significant risk factor for developing type II diabetes in childhood[5]. The main causes of obesity include a lack of physical activity, consumption of energy-dense foods containing saturated fats and sugars, and an obesogenic environment [5]. Historically, Aboriginal people had a diet high in protein, moderate in fat, and low in carbohydrates[8]. In the 1940s however, prior and continued government paternalism such as assimilative policies contributed to a shift in their diet towards prepackaged foods high in saturated fats and refined carbohydrates (simple sugars)[5]. A return to traditional Aboriginal diets is encouraged as a study published by McAuley et al. (2005) found that diets high in protein and low in carbohydrates were better at reducing insulin resistance in women with insulin resistant obesity than diets high in carbohydrates. Exercise and obesity also go hand in hand, it is well known that exercise can prevent and reverse obesity.

Social Determinants of Health. There are many social determinants of health and they can be divided into three non-mutually exclusive categories: distal (historical and macro systems issues), intermediate (community and local issues), and proximal (personal health behaviours)[10]. For example, Indigenous culture perceives health in a

holistic manner. This perception often conflicts with mainstream medical practices, where health is divided in-terms of organ systems, and may be a barrier to seeking care. Furthermore, in some cases, Aboriginal peoples' past experiences with the healthcare system has resulted in neglect and harm. Finally, healthcare accessibility is limited to a majority of Aboriginal people due to a lack of community health services or transportation issues. From this one example concerning healthcare, it is clear to see that there are many social barriers preventing Aboriginal people from utilizing healthcare system.

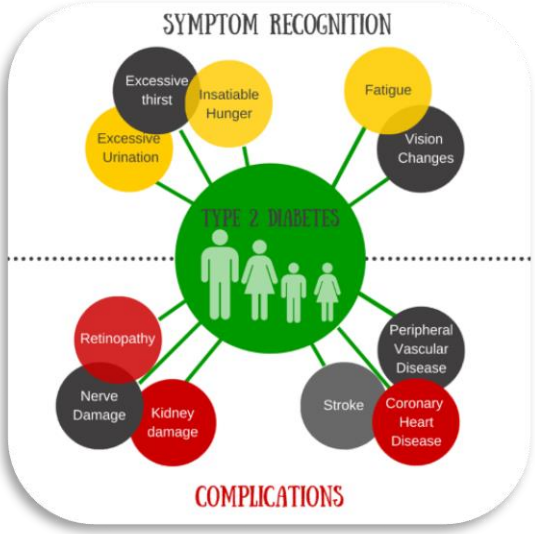
Exposure to diabetes in-utero. There have been many studies to suggest that pre-existing type II diabetes in the mother during pregnancy increases the likelihood of type II diabetes in the child[5]. Similarly, gestational diabetes* will also increase the risk of type II diabetes mellitus in the baby[11].

Genetics: A polymorphism is a place in the DNA where genetic differences are more frequently found in different populations.

The Oji-Cree speaking people experience one of the highest prevalence of type II diabetes in Canada[5]. This high prevalence rate can be, in part, attributed to the polymorphism unique to the Oji-Cree speaking population[5]. Clinical presentations of children and youth with this polymorphism and type II diabetes are leaner, have lower insulin levels, greater insulin sensitivity, less insulin related conditions, and a higher hemoglobin AlC when compared to their peers without the polymorphism[5]. This phenotype is consistent with decreased insulin production[5].

Treatment of Type II Diabetes in Youth

Despite the high prevalence (17.2% in Oji-Cree communities) of type II diabetes in children and youth, there are only limited treatment options[5, 12]. In the immediate stages of type II diabetes, management depends on clinical presentation[12]. That is to say, in the acute stages of type II diabetes, the purpose of treatment is to restore the body's blood glucose back to normal physiologic levels. In chronic (i.e. long-term) states of type II diabetes, the goals of treatment include maintaining blood glucose within normal levels, minimizing risk factors such as obesity, and preventing type II diabetes related complications. These goals are difficult to achieve because they involve major lifestyle changes (e.g. diet, exercise)[12], however, studies have found that family centered changes[12] and culturally appropriate changes[6] make these goals more attainable. If aggressive lifestyle changes are not attainable, then drug-therapy is considered[6]. The main action of drug therapies is to reduce hepatic (liver) glucose production [13], and stimulate the pancreas to release more insulin[14]. Insulin treatment, although lacking strong evidence for treating type II diabetes in children, has been tested in an adult population with type II diabetes and has shown some benefit[12]. Currently, the most common treatment for type II diabetes in the long-term, is aggressive family centered and culturally appropriate lifestyle changes[6].



*Adapted from epgonline[15]

* Gestational diabetes is diabetes that occurs (typically) around the 24th week of pregnancy. The mother's decreased ability to respond to insulin is believed to be related to the placenta, therefore, after the placenta is delivered (also known as the afterbirth), gestational diabetes should be resolved (11).

Comorbidities and Complications of Type II Diabetes in Youth

The two major comorbidities of type II diabetes are hypertension and dyslipidemia[4]. Complications of type II diabetes in youth include "severe and early onset microvascular disease, including retinopathy, neuropathy and nephropathy" and micro- or macro-albuminuria (i.e. too much of a common protein (albumin) in the urine)[6]. Aboriginal youth specifically are also at increased risk of developing renal disease not generally associated with diabetes[6].

Comorbidities: conditions that accompany a certain disease
Complications: secondary problems cause by the primary disease
Retinopathy: destruction of the retina in the eye
Nephropathy: destruction of the kidneys
Dyslipidemia: Abnormal blood lipids
Hypertension: High blood pressure
Neuropathy: destruction of peripheral nerves
Microvascular disease: disease affecting the small blood vessels of the body

Implications for service providers: Although there are some risk factors that cannot be overcome (i.e. genetics, in-utero exposure), there are some lifestyle factors that can be addressed to reduce risks. These include incorporating more physical activities in programming and always providing healthy foods (e.g. foods high in protein, low in carbohydrates and fats).

By providing healthy food options and including physical activity in programming, service providers can help families reduce risks associated with diabetes, as well as support those currently living with diabetes to make important lifestyle changes. Service providers should aim to become leaders in diabetes prevention for the future health of Aboriginal children and youth.

Additional Resources

Southern Ontario Aboriginal Diabetes Initiative (www.soadi.ca)
National Aboriginal Diabetes Association (www.nada.ca)
For additional resources on other topics please visit www.healthyweightsconnection.ca/resources

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