**INTERVENTIONS TO TACKLE DIABETES IN INDIGENOUS CANADIANS**

**Introduction**

The indigenous populations in the northern parts of Canada have gone through drastic dietary and lifestyle changes in half a decade that have intensified the cases of obesity and type-2 diabetes (Toth et al. 2016). Type 2 diabetes is a condition linked to diet and low levels of physical activity resulting in obesity (Rankin 2017). According to Cloutier, Dean and Sellers, (2009) First Nation peoples are genetically predisposed to type two diabetes. Profound changes in the way of life and nutrition are the major contributing factors to the persistence of lifestyle diseases in these communities. Historically, the indigenous people of northern Canada have been known to rely heavily upon on locally harvested food for their daily nutrition. However, in the recent years, western dietary habits have undermined these practices continuously. This review explores how social factors influence the prevalence of diabetes in these populations and looks into interventions that have been implemented to tackle this disease.

A survey of chronic diseases in Canada revealed that First Nation populations had a record of hypertension, diabetes, diabetic foot disease, and heart disease that was higher than the national average (Schoen and Norman 2014). Oster et al. (2012) suggest the prevalence of chronic conditions in these populations was highlighted by early symptoms in people as young as 18 years, and diabetes in pregnant women (Porter, Skinner and Ellis 2012). In a study focusing on a specific community residing in Northern Ontario, the occurrence of obesity and type-2 diabetes mellitus is the highest. The adults in these populations have indicated a higher prevalence of being obese compared to Individuals with European ancestry. Despite the fact that the current sedentary lifestyle is a key contributing factor, changing dietary habits is the primary reason for the high incidences of chronic conditions. Over the years, there has been a noticeable shift from traditional foods to processed foods containing large servings of simple sugars (Naqshbandi et al. 2008).

Social determinants of health are greatly linked to the incidence of diabetes in indigenous communities. These factors include:

**Economic determinants**

Income has a significant influence on the quality of life, type of diet and the availability of food. The group most susceptible to diabetes and its subsequent complications are low income Canadians (Kolahdooz et al., 2015). The disease is most prevalent in women and aboriginals. Much of this prevalence is attributed to the lower socio-economic status compared to the rest of the Canadian population. These facts drive researchers to focus on stress about income and food insecurity as contributing factors in the incidence and management of diabetes. In Canada, people with lower income levels have  increased the risk of diabetes.

**Cultural determinants**

In the Northern Parts of Canada, societies historically consumed all types of food available on the land. The traditional diet of the indigenous people would be described mainly as carnivorous, chiefly consisting of meat with limited amounts of carbohydrates (Crowshoe et al. 2018). In contrast, the contemporary menu contains high amounts of refined sugars and saturated fats. On the establishment of permanent settlements, these populations began to rely on store-bought food and hence lesser reliance on traditional methods of looking for food.  In modern times, there is widespread access to processed foods from stores and outlets. These changes would mean excessive intake of energy provided as junk foods, soft drinks, and processed meat. It is posited that these changes in feeding habits eventually led to the high obesity and Type-2 diabetes mellitus in the regions (Haman et al. 2010).

**Education**

A significant gap exists between the educational achievements of indigenous and non-indigenous Canadians. An approximation of 40% Aboriginals in Alberta have not completed their high school education (Kolahdooz et al., 2015). In this study, lower levels of education in First Nation peoples attributed to the prevalence of type 2 diabetes among these communities. Additionally, there is a notable disconnect between academic knowledge and community-level education.

**Employment**

Aboriginals in Canada experience lower employment rates compared to non-indigenous peoples (Kolahdooz et al., 2015). Lower rates of employment are related to lower educational attainment, which subsequently affects the quality of life negatively. Additionally, most aboriginals work in precarious employment conditions. Therefore, they are likely to face obstacles in self-management, especially when operating in work environments that offer little support in taking short breaks and monitoring blood glucose. In harsh working environments, workers are often afraid to ask permission for breaks for the feat of being fired.

**Prevention and Management of Diabetes**

Two main approaches are used as the foundational frameworks for addressing diabetes in Canada. The population approach and the individual approach. The population level approach entails the promotion of health awareness and implementation of healthy public policies (Pan American Health Organization, 2011). Individual approaches are primarily contextualized in primary health care and include components such as; exercise plans, medication, and healthy meal plans (Pan American Health Organization, 2011). Both methods are utilized in the primary and secondary prevention of diabetes.

**School-Based Interventions**

An example is the Kahnawake Schools Diabetes Prevention Project (KSDPP) (Institute of Health Economics, 2017). The project was initiated from the concern that obesity had increased in children and teenagers. This intervention focused primarily on indigenous children. The intervention entails a holistic approach where peer mentoring is used as the primary strategy to change children's eating habits. However, this type of strategy meets limitations because it fails to address the underlying issues of food access and availability of food in indigenous communities (Rice et al., 2016). The intervention mainly takes an individual as it has the potential to focus on the high-risk individuals.

**Prevention Interventions**

Preventive strategies have to be contextualized within primary healthcare to be effective. An efficient primary health care system reduces the health inequalities experienced by aboriginals (Harris, Tompkins, and TeHiwi, 2017). The Canadian government funds such initiatives through the First Nations and Inuit Health Branch, which offers public health and prevention services to indigenous peoples who are registered (Rice et al., 2016). In the same fashion, the Aboriginal Diabetes Initiative promotes and diabetes prevention services to First Nation peoples. Prevention interventions mainly take a population approach, as they are mostly involved with educative initiatives.

**Aboriginal Diabetes Initiative (ADI)**

Through partnership and collaboration with aboriginal communities, programs and initiatives in the management and prevention of diabetes have been carried out. Activities in the program include screening. The best example if the Screening for Limb, Eye, Cardiovascular, and Kidney Project (SLICK) for indigenous people with Type two diabetes (Leung, 2016). Included in the Initiative, was the Food Skills for Families Program (FSFP) that trained facilitators who demonstrated in schools and communities on the best and healthiest cooking practices (Leung, 2016). The deployment of mobile units to offer screening services and medical advice tackled health inequities in the Canadian population.

**Dietary Interventions**

 There is the widespread acknowledgment of the various advantages of traditional diets within the academic community. Some of the cultural benefits include, local food used as a cultural anchor, used as an identity to aboriginal people, sharing of traditional meals plays a vital role in maintaining societal norms and expectations, and the instrumental part of conventional foods from a spiritual aspect. In several rural native populations, local dietary practices are often looked down upon as inferior and primitive. In contrast, scientific evidence shows that traditional diets have substantial health benefits. This knowledge is a critical contributing factor in promoting local diets and increasing indigenous pride in the harvesting traditions that will eventually increase the consumption of these foods. Haman et al. (2010) posit that combined local and scientific support for traditional food sources will help substantially by increasing awareness towards maintaining local dietary practices. This intervention mainly takes a population approach as it is involved with initiatives that inform people about the benefits of the traditional diet.

**Promotion of Self-Management Interventions**

Promotion of self-management methods is also crucial in the management of diabetes. Initiatives to encourage individuals to make personal decisions to engage in more activity that is physical and making healthier food choices (Carriere et al. 2009). Campaigns to help people to practice regular screening for diabetes are also vital for its management. Additionally, a study by Isaak and Marchessault (2008) indicated that the aboriginal participants valued sport and physical activity. Increased initiatives to improve health care relationships are also crucial in the management of diabetes. Patients who have diabetes often opt to seek traditional treatment, countering medical interventions in the treatment of diabetes (Crowshoe et al. 2018). Additionally, most of the individuals with type-2 diabetes have trouble with a changing lifestyle to habits that have the potential to assist in the management of the disease (McGavock et al. 2016). A study by Neufeld (2011) investigating how women with gestational diabetes perceive dietary changes advised by nutritionists revealed the advice was poorly regarded. This intervention takes both an individual and population approach as it involves both affected individuals and informs the public about diabetes.

**Conclusion**

Finding the best intervention when addressing the issues of diabetes and nutrition-related diseases is a significant hurdle to the administration of health services. Incidences of type 2 diabetes continue to rise in the aboriginal population in Canada. Some of the contributing factors of the prevalence of the disease are the lifestyle and social disparities resulting from political marginalization. The Canadian government launched initiatives such as the ADI to enhance early detection and prevention of the disease. The integration of both individual and population approaches are instrumental in the prevention and management of diabetes.

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