Knowledge, Attitudes, and Beliefs of Whitefish Bay Residents Regarding Type 2 Diabetes

by

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Abstract

The purpose of this study was to explore Whitefish Bay residents' knowledge, attitudes, and beliefs of Type 2 diabetes. The objectives were to examine current literature related to Type 2 diabetes with an emphasis on the Aboriginal population; distribute a questionnaire to assess knowledge, attitudes and beliefs, to assess Whitefish Bay residents for the risk of Type 2 diabetes; and make recommendations regarding prevention of Type 2 diabetes for Whitefish Bay residents. A questionnaire was developed by the researcher to obtain basic information from residents on demographics, beliefs surrounding the meaning of diabetes, knowledge of specific risk factors, knowledge of signs and symptoms and complications, and attitudes toward prevention of diabetes. For feasibility, the questionnaire utilized closed-ended questions to address the questions posed. Data were collected from a cohort of 175 Whitefish Bay residents over the age of 18. This sample size reflected approximately 55% of the total eligible population. Questionnaire data demonstrated that fifty-five (55%) had knowledge of a general definition of Type 2 diabetes. Areas of potential education were noted in identification of risk factors, signs and symptoms, and complications. Certain groups appear to be more at risk, such as males, those less educated, unemployed, individuals with no family history of diabetes, and those who have never been screened before. The previous groups appear more at risk due to a lower level of knowledge in variables such as risk factors, signs and symptoms, and complications. The current prevalence of diabetes was determined to be 11%, and a further 13% of those screened by Naotkamegwanning Health Services had impaired glucose tolerance on casual testing.

Recommendations included strategies such as developing culturally appropriate educational materials to increase awareness to improve prevention and early detection. Populations within Whitefish Bay who are at greater risk should be targeted with health promotion campaigns to increase primary and secondary prevention. These could include educational programs to be delivered in public schools and at community events. Screening for Type 2 diabetes should continue in order to educate those with impaired glucose tolerance or impaired fasting glucose on the importance of lifestyle modifications. Due to the environmental contributions related to Type 2 diabetes, partnerships with both the private and public sector to increase collaboration in the fight against Type 2 diabetes would enhance preventative messages and community acceptance. For collaboration to be effective, funding for health care professionals to provide health promotion and prevention must increase. Further, the skills of health care professionals must improve to provide culturally appropriate care targeted at primary, secondary and tertiary prevention of Type 2 diabetes. Finally, research needs to be completed to determine what barriers Whitefish Bay residents are enduring that inhibit healthy lifestyles. Future research that is conducted should distinguish between diabetics and nondiabetics in order to develop appropriate prevention programs based on their cohort's knowledge, attitudes, and beliefs. This research can be utilized to create more effective health strategies. Research of this nature should also be completed in other communities due to individual community characteristics that can contribute to differences knowledge, attitudes, and beliefs with regard to Type 2 diabetes.

Acknowledgements

I would like to thank the community of Whitefish Bay for their participation in this study. By taking the time to complete the research questionnaire, it is hoped that awareness, diabetes prevention, and diabetic services can be enhanced for the community. Thanks is given to Pat Copenace (Community Health Representative of Whitefish Bay) for her cultural insight, dedication to the health of her community, and liaison with the local Band Council and Board of Health to make this study possible.

Warm thoughts are extended to my family, especially my husband for all of the support, patience and encouragement throughout the research process. Special thanks to my mom, otherwise known as my editor, for her never ending diligence and proficiency.

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CHAPTER 1: INTRODUCTION TO THE STUDY

Purpose of the Study

When compared to non-Aboriginal counterparts, Aboriginals have a higher rate of Type 2 diabetes. Health Canada (2000) cited statistics of diabetes ranging from "3 to 5 times that of the general population for First Nations" (p. 10). The purpose of the study was to examine the knowledge, attitudes, and beliefs about Type 2 diabetes of the residents of Whitefish Bay ages 18 and older.

Objectives of the Study

1. To examine the current literature related to Type 2 diabetes, with an emphasis on the knowledge, attitudes, and beliefs of Type 2 diabetes in Aboriginal populations.
2. To develop a questionnaire to assess Whitefish Bay residents' knowledge, attitudes, and beliefs about Type 2 diabetes.
3. To assess Whitefish Bay residents for the risk of Type 2 diabetes by analyzing blood samples collected by the Whitefish Bay Community Health Centre (Naotkamegwanning Health Services Clinic) from residents ages 18 and older.
4. To make recommendations to the residents of Whitefish Bay regarding the prevention of Type 2 diabetes.

Theoretical Framework

The Health Belief Model (HBM) was chosen as the framework for this research because it helps to explain certain health-related behaviours, explains why these behaviours occur, and identifies possible areas of change. The HBM has been used to help develop messages that are likely to persuade individuals to make healthy decisions.

The HBM is suitable for health education topics such as hypertension and eating disorders (Mississippi State University, 2001).

The HBM was developed by social psychologists Godfrey Hochbaum, Irwin Rosenstock, and Stephen Kegels in 1950 while they were working for the U.S. Public Health Services. The model was developed following a tuberculosis screening and prevention program to determine what motivated individuals to attend the screening and prevention program. It appeared that the individuals' perceived risks and benefits of action were critical in motivating them. The HBM assumes that a person will take action to protect or enhance health if that person feels that there is a negative health condition that can be avoided (i.e. Type 2 diabetes); that taking an action will avoid the negative health condition (i.e., eating healthy foods and exercising will prevent diabetes); and that the recommended health action is attainable (i.e., the cost benefit of exercising or eating healthier will not be too high; Resource Center for Adolescent Pregnancy Prevention, 2005). The key elements of the HBM include:

1. Perceived Susceptibility
    - Individuals' beliefs or perceptions of their risk of getting a health condition.
2. Perceived Severity
    - Individuals' beliefs or perceptions of the severity of a health condition and the consequences of not treating it.
3. Perceived Benefits
    - Individuals' beliefs or perceptions that a selected action will reduce the severity or risk of obtaining the health condition in the first place.
4. Perceived Barriers

- Individuals' beliefs or perceptions of negative associations, such as physical, financial, social and psychological impacts, that could occur from taking the suggested action.

5. Cues to Action
   - Strategies that motivate individuals to take action.
6. Self-Efficacy
   - Self-confidence of the individuals to complete the necessary action (Communication Initiative, 2006).

The HBM and its application with regard to the motivation for undertaking a health behaviour, are divided into three main categories: individual perceptions, modifying behaviours, and likelihood of action (see Figure 1). Individual perceptions relate to the perceived susceptibility and/or severity of the illness or disease. Modifying factors include demographic variables such as age; gender; knowledge; perceived threat of obtaining the disease; and actions to move the person to prevention, such as symptoms of the illness or medical information. Individual perception, combined with the modifying factors, determine the likelihood of the individual taking action. In order for the individual to take action, the benefits must outweigh the cost, and there must be a high enough perception that the disease or illness is a threat (University of South Florida, 1999).

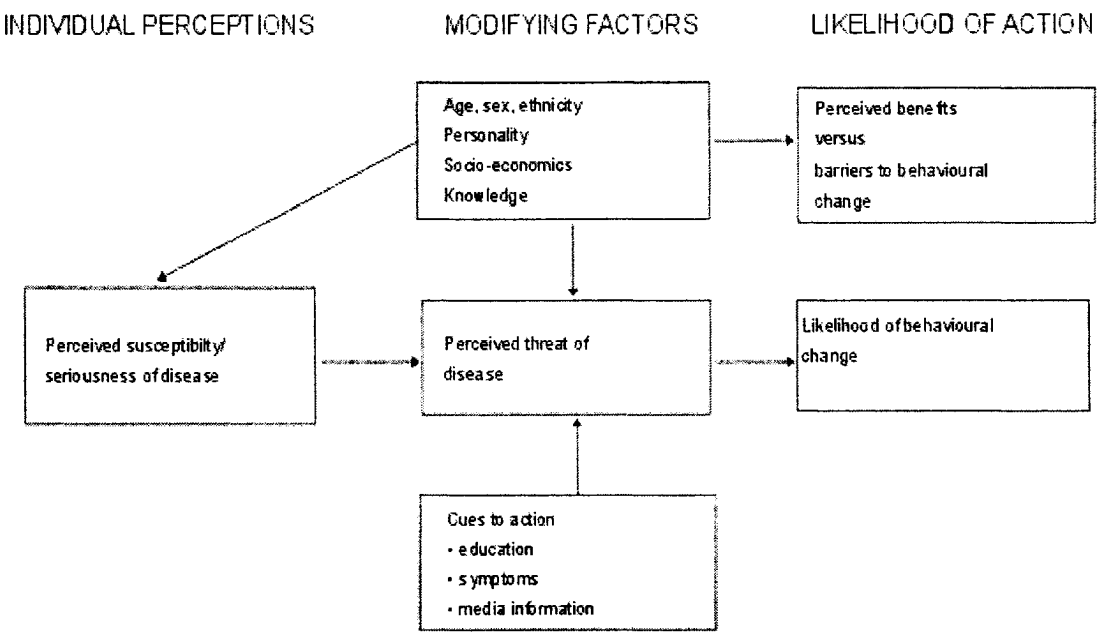

Figure 1. Health belief model.
From K. Glanz, B. K. Rimer, & F. M. Lewis, (2002). Health Behaviour and Health Education. Theory, Practice and Research. (p. 52).

One precaution of utilizing the HBM is the potential to place blame on the individual. The HBM emphasizes the importance of personal action, choices, and behaviours in preventing an unwanted health consequence. The HBM does not take into account factors that may be out of the individual's control, such as the economics of the person or community and environmental factors. For example, a person living in a rural, remote northern community may very well want to eat fresh fruit and vegetables, but may not have access to these products due to a lack of availability and the high cost of such items. Such barriers can be at least partially addressed by developing health campaigns that involve key stakeholders from the private and the public sectors to help make factors such as the environment, which may be out of an individual's control, more conducive to avoiding the unwanted health consequence.

The HBM was utilized as the foundation for this study because it allowed the researcher to create a questionnaire geared toward identifying individual perceptions of

Type 2 diabetes, perceived threats, and modifying factors that may determine health-related behaviours of various subpopulations (i.e., those of different gender, age, and education level) and their likelihood of action. One could also consider the use of the determinants of health as a framework; however, this model was not chosen because it does not take into account the individual's perception to susceptibility, severity, benefits and barriers with regard to an illness.

CHAPTER 2: LITERATURE REVIEW

An Overview of Diabetes

Current literature of Type 2 diabetes among the Aboriginal population is critically examined in this chapter, thus providing a knowledge base for the research and revealing gaps in the literature. A definition of Type 2 diabetes is presented. A general overview of Type 2 diabetes is discussed, with specific attention to incidence, signs and symptoms, risk factors and tests, comorbidity, and life expectancy. The status of Aboriginal health in general is discussed and then related to specific factors about Type 2 diabetes. Some examples are beliefs regarding diabetes origin, denial of a diabetic diagnosis, lifestyle changes, and treatment. It should be noted that a thorough search for literature was completed via PubMed, ProQuest, and Ovid, and the sources of literature were primarily Canadian oriented.

"Diabetes mellitus is a chronic disorder of carbohydrate, fat, and protein metabolism" (Kumar, Cotran, & Robbins, 2003, p. 641). There is a relative or absolute deficiency in insulin secretory response and impaired glucose use, resulting in hyperglycemia. There are two major types of diabetes, namely, Type 1 and Type 2, which vary in origin and insulin response (see Table 1). According to Kumar et al., there are two fundamental metabolic defects that distinguish Type 2 diabetes, including a "derangement in beta-cell secretion of insulin and an inability of peripheral tissues to respond to insulin (insulin resistance)" (p. 645).

Table 1

Type 1 and Type 2 Diabetes: A Comparison

	Type 1	Type 2
Clinical	Children > adults Normal weight Decreased blood insulin Anti-islet cells antibodies Ketoacidosis common	Adults > children Obese Normal or increased blood insulin No anti-islet cell antibodies Ketoacidosis rare
Genetics	40% concordance in twins	60%-80% concordance in twins
Pathogenesis	Autoimmunity Severe insulin deficiency	Insulin resistance Relative insulin deficiency

Adapted from "Robbins Basic Pathology," by V. Kumar, R. S. Cotran, & S. L. Robbins, 2003.

A diagnosis of diabetes is made with a fasting plasma glucose (FPG) greater than or equal to 7.0 mmol/L, casual Plasma Glucose (PG) greater than or equal to 11.1 mmol/L with symptoms or a 2-hour plasma glucose in a 75-gram oral glucose tolerance test greater than or equal to 11.1 mmol/L (two tests are needed to confirm diagnosis; (Canadian Diabetes Association [CDA], 2003). A FPG that is between 6.1 and 6.9 mmol/L is considered to be an impaired fasting glucose, and an impaired glucose tolerance is a reading of 7.8 to 11.0 mmol/L.

Prevalence of Diabetes

According to the CDA (2006d), "More than 2 million Canadians have diabetes" (p. 1). Therefore, about 5% of the Canadian population has diabetes (Health Canada, 2000). Of these, 90% have Type 2 diabetes. Type 2 diabetes was previously called adult onset diabetes. However, "increasing numbers of children in high-risk populations are being diagnosed" (p. 1), so it is no longer considered a disease of adulthood. "There is a growing incidence of Type 2 diabetes in children from high-risk populations. Recent data suggests an American child born in 2000 stands a one in three chance of being diagnosed with diabetes in his or her lifetime" (CDA, 2006a, p. 1). In developed countries, the age-

adjusted prevalence of diabetes ranges from about 5% among people of European ancestry to 40% or higher in Aboriginal populations. According to current trends, the prevalence of diabetes globally is expected to rise by 61% (Gerstein & Waltman, 2006).

The diabetes statistics for Aboriginals is at epidemic proportions when compared to the general Canadian population. "The Oji-Cree population of the Sandy Lake region of Ontario has the third highest prevalence of Type 2 diabetes in the world" (Carpentier et al., 2003, p. 1485). Reported age-standardized prevalence rates of diabetes in Sandy Lake First Nation is 280/1000 and 242/1000 for women and men. Comparable numbers have been noted in other communities as well. Green, Blanchard, Young, and Griffith (2003) studied the epidemiology of diabetes among registered First Nations in Manitoba and found a prevalence of 248/1000 and 170/1000 for women and men, respectively, from data collected from the population-based Manitoba Diabetes Database. Green et al. found the rate of diabetes in the Manitoba First Nation population "up to 4.5 times higher than those found in the non-First Nation population" (p. 1993). According to Health Canada (2000), "When controlling for the different age demographics among the two populations, the age standardized prevalence of diabetes for First Nations people is 3 to 5 times that of the general population" (p. 10).

Johnson, Martin, and Sarin (2002) completed a study examining the prevalence of diabetes in the Status Indian population living on reserve in British Columbia. They utilized a questionnaire that was distributed to various health facilities that provide health care services to First Nations in British Columbia. The response rate was 45%. The findings indicated a rate of First Nations diabetes for British Columbia of 2.6%, with significant regional variation showing a higher prevalence in the southern communities.

However, the prevalence of Type 2 diabetes appears to be on the rise, as noted by a 100% increase from 1987 (1.2%) to 1997 (2.6%) for First Nations populations in British Columbia. However, of the 198 health facilities where the questionnaire was provided, only 82 completed the questionnaire. According to Johnson et al., "If the current incidence of diabetes remains unchanged, the number of Aboriginal people with diabetes in Canada will triple by 2016" (p. 264). With this increased morbidity comes increased mortality. Mao, Moloughney, Semenciw, and Morrison (1992) found that there is "a greater than 5-fold risk of death from diabetes among women residents on reserve compared with Canadians nationally" (as cited in Young, Reading, Elias & O'Neil, 2000, p. 2).

Do we have an epidemic at hand? Young et al. (2000) wrote a review outlining the upswing of the diabetes trend:

> Before the 1950's Type 2 diabetes was rare in Aboriginal populations. Within the past 2 decades, a rapid increase in prevalence has been documented...In the Sioux Lookout Zone of NWO the prevalence increased by 45% over a 10 year period. In Saskatchewan the rate doubled between 1980 and 1990. (p. 4)

With rapidly increasing numbers of cases, a decreasing age of onset, and no turnaround likely in the near future, an epidemic is clearly occurring.

Signs and symptoms. The following is a list of signs and symptoms of diabetes as outlined by the CDA (2006c):

- Unusual (increased) thirst.
- Frequent need to urinate.
- Changes in weight (increase or decrease).
- Extreme tiredness or lack of energy.
- Blurred vision.

- Frequent and/or recurring infections.
- Bruises and cuts that take a long time to heal.
- A sensation of tingling or numbness in the distal parts of the body (hands or feet).
- Trouble getting or maintaining an erection.

Unfortunately, one of the troubling aspects of Type 2 diabetes is that many people who have it may not manifest any symptoms (CDA).

Risk Factors for Diabetes

Various factors are associated with either an increased risk or a protective mechanism in relation to the development of Type 2 diabetes. As previously discussed, not all individuals with Type 2 diabetes will present stereotypical signs and symptoms. In fact, many people have Type 2 diabetes without any symptoms (CDA, 2006c). Sunday and Eyles (2001) exemplified this point in their study of diabetes among First Nations people in two Anishnaabe communities on Manitoulin Island, Ontario. Using qualitative research methods, they interviewed 28 community members (15 individuals diagnosed with diabetes, and 13 without) and 18 health care providers to obtain general perceptions in areas such as general health, causes of diabetes, and conditions surrounding diabetes. How the sample was obtained was not mentioned. They often found that the individuals were diagnosed with diabetes when they were visiting the doctor or at the hospital for reasons other than the signs and symptoms of diabetes. Therefore, monitoring the blood glucose level is of the utmost importance for a diagnosis.

Being overweight and/or obese is clearly a powerful risk factor cited within the literature (Narayan, Kanaya & Gregg, 2003; Schulze & Hu, 2005; Steyn et al., 2004;

Tulloch-Reid, Williams, Looker, Hanson, & Knowler, 2003; Young et al., 2000). Tulloch-Reid et al. investigated various measurements of obesity to determine which measures were the best predictors of Type 2 diabetes in a population of Pima Indians. They followed 624 men and 990 nonpregnant women for an average of 5.25 years for the development of Type 2 diabetes. People from the community were invited to partake in examinations twice a year, which consisted of a medical history, a physical examination, and lab tests. During the follow-up, 322 new cases of Type 2 diabetes were established. They found that body mass index (BMI), that is, the relationship of weight to height, was an excellent predictor of Type 2 diabetes and that this risk factor was not improved significantly by using other measures of body fat distribution. Narayan et al. completed a literature review that reviewed observational studies looking for links between lifestyle behaviours and diabetes incidence and clinical trials for effective prevention of diabetes through lifestyle modification. They concluded:

> BMI was associated with a 12% increased risk of Type 2 diabetes. For example, compared to persons with a BMI<22, those with a BMI of 25-27 (considered somewhat overweight) had 2.75 times the risk of developing diabetes, and those with a BMI of 31-32.9 had a 7-fold increased risk (p. 315)

However, that is not to say that the effect of BMI comes without controversy. Wang, Rimm, Stampfer, Willett, and Hu (2005) completed a large prospective cohort study consisting of 27,270 male health professionals. The men (ages 40-75) completed a detailed survey beginning in 1987 with information pertaining to diet, lifestyle practices, and medical history. The participants self-reported height, weight, waist circumference (WC) and waist-to-hip ratio (WHR). They found that BMI was not as strong as WC as a predictor for the development of Type 2 diabetes. An obvious limitation to this study would be the fact that only males were followed. This brings into question if using BMI

as a predictor is effective if it varies among gender, race, and age. There is a lack of research in this area. Therefore, more research needs to be done examining the most effective measurement of weight and fat distribution to determine risk.

Steyn et al. (2004) completed a meta-analysis that reviewed multiple clinical trials and cohort studies in order to look at current evidence and provide recommendations related to the prevention of Type 2 diabetes via diet and lifestyle. Their review of the literature suggested that physical inactivity is another risk factor that can be modified. They found that the ill effect of physical inactivity increases in those with high BMIs, hypertension, or parental diabetes. "The Aboriginal People's Survey showed that 54% of Aboriginal adults nationally participate in leisure-time activity" (as cited by Young et al, 2000, p. 6).

Statistics have shown that physical activity is associated not only with a healthy body weight but also with insulin sensitivity (Narayan et al., 2003; Schulze & Hu, 2005). Insulin sensitivity plays a key role in Type 2 diabetes. The body's release of insulin facilitates the transport of glucose into cells, allowing the glucose to be utilized and to lower plasma levels of glucose. The problem with obesity is the abundance of fat cells. Fat cells tend to be much more resistant than muscle cells to insulin's attempts. Therefore, the pancreas of an obese person has to work much harder and produce more insulin to try and compensate for this resistance. Schulze and Hu demonstrated the importance of physical activity in their review of epidemic and clinical trial evidence on the ability to prevent diabetes through various methods by noting that "each 1 hour/day of brisk walking is associated with a 24% reduction in obesity and a 34% reduction in diabetes risk" (p. 452).

The 1991 Aboriginal People's Survey found that the diets of Aboriginal people have been changing from traditional food items to Western food, with only "15% of Aboriginals still obtaining most of their meat and fish from hunting and fishing" (as citied in Young et al., 2000, p. 6). There may be several reasons for this transition. Education is beginning to play a key role in society. If those who would have hunted in the past are at school or are working, this leaves little time for hunting and traditional food-gathering techniques. Also, the types of food that are available to be purchased in rural and remote areas need to be considered. Access to fresh fruit and vegetables may be very limited, and when they are available, their high cost may inhibit many from consuming these goods. Many of the foods that are more affordable tend to be highly processed items that contain high amounts of saturated fats and sugar. Narayan et al. (2003) demonstrated that the types of carbohydrates and fats consumed have an effect on the risk for Type 2 diabetes. "Higher intake of polyunsaturated fat and long chain fatty acids (fish oil) may be beneficial; higher intake of saturated fat and trans-fatty acids may be deleterious" (p. 316) and may increase the risk of Type 2 diabetes.

At first, one may automatically assume that alcohol consumption would increase the risk of Type 2 diabetes. However, several studies have suggested that moderate alcohol intake may be a protective factor (Schulze & Hu, 2005; Steyn et al., 2004). Recommendations are lacking at this point and further research needs to be conducted. This potential protective factor does not outweigh the risks of excessive alcohol consumption.

Following the cessation of smoking, people tend to gain weight. However, a study by Field et al. (2004) clearly demonstrated that "the beneficial effects of smoking

cessation on diabetes risk outweigh the adverse effects on weight gain...(smoking cessation) increases insulin sensitivity and improves lipoprotein profiles" (as cited in Schulze & Hu, 2005, p. 452). Therefore, if one smokes, the sensitivity of a cell to recognize insulin and, hence, be able to take in and utilize glucose diminishes. Once again, the pancreas would need to release more insulin to compensate, evidently increasing the risk of Type 2 diabetes.

Even while in utero, the future child may begin to experience potential risk factors. Gautier et al. (2001) stated:

> Offspring of diabetic pregnancies are often large at birth, they tend to develop obesity in childhood and are at a high risk of developing Type 2 diabetes at an early age. Such individuals have lower insulin secretion than similarly aged offspring of non-diabetic pregnancies. (as cited in Steyn et al., 2004, p. 155)

Furthermore, babies who are breastfed exclusively for the first 2 months of life have a 50% less chance of developing diabetes. However, the mechanism of this has not yet been established. One could imagine that this may be due to the baby self-regulating how much to eat at each feeding rather than a parent pouring a predetermined amount for the baby to consume. The theory may come down to the infant learning self-regulation at an early age.

Family history can increase the risk for Type 2 diabetes as much as two to sixfold if either a parent or a brother or a sister has diabetes due to genetic and environmental conditions (Steyn et al., 2004). Because both genetics and the environment play a role in the development of Type 2 diabetes, the lifestyles of those surrounding an individual may have an impact on their risk. For example, a family member may be more inclined to exercise if he/she witnesses siblings or parents exercising on a regular basis and will be more likely to eat foods that are accessible within his/her immediate environment. This

may have a special impact on young children, who do not purchase the foods to be consumed in the household and, hence, have very little control over healthy choices.

Finally, age and gender also have an influence over susceptibility. As cited by Health Canada (2000), two thirds of First Nations people diagnosed with diabetes are women, which contrast with the entire Canadian population in which there is a higher prevalence in men. Dabelea et al. (1998) noted that the prevalence of Type 2 diabetes increases overall with age; however, trends are demonstrating increasing cases in children and teens (as cited in Steyn et al., 2004).

Screening Tests for Risk Assessment

Several well-known organizations have developed online resources for individuals to access to determine their level of risk (not to replace medical opinion). For example, The CDA (2006a) has a Web page entitled, "*Are You at Risk?*" in which individuals can browse through a list of possible risk factors such as high blood pressure, being overweight, coming from a high-risk cultural group, and so on, and check off boxes that apply to them. A recommendation is included that if any of the boxes are checked off, testing for diabetes should be completed. The American Diabetes Association (2006a) has a similar tool on their Web site in which participants answer several questions and are given scores; advice is then given for future actions depending on their scores.

The availability of risk tests online is an indication of the amplitude of the diabetes epidemic. Screening tools such as the above can also be found in several locations such as doctors' offices, pamphlets in various facilities, pharmacies, and so on.

This increases the accessibility to individuals. However, an individual may have to feel at risk in order to review such questionnaires.

Comorbidity

Type 2 diabetes can be associated with multiple comorbidities that lead to a decreased quality of life, increased hospital admissions and health care expenditures, decreased employment rates and incomes, and a shortened life span. Simmons and Voyle (2003) surveyed 436 Maori and other indigenous peoples to determine their diabetic knowledge. They found that 65% of those surveyed had no knowledge of complications. An international study from India also demonstrated a low awareness of complications. Mohan et al. (2005) utilized a questionnaire with 26,001 systematically selected participants to determine awareness and knowledge of diabetes. They found that only "75.5% of the whole population reported that they knew about a condition called diabetes...only 19% of the whole population knew that diabetes could cause complications" (p. 283).

A brief overview of complications is outlined below. It should be noted that there is a vast amount of research in comorbidities, so the intent of the researcher is to give the reader an introduction to the detrimental effects that diabetes can have on health and quality of life. This is not a comprehensive review of the literature in relation to comorbidities because that is beyond the scope of this paper.

Complications from Diabetes

Diabetes can lead to various complications such as cardiovascular disease, neuropathy, kidney disease, eye disease, and impotence (CDA, 2006c).

Cardiovascular disease. "Approximately 80% of people with diabetes will die as a result of heart disease or stroke" (CDA, 2006d, p. 1). The concern with heart disease is the increased risk in diabetics of developing arthrosclerosis (hardening of the arteries). This hardening of the arteries leads to a narrowing of arteries and the potential for the flow of blood within the arteries to become impeded, leading to myocardial infarctions or cerebral vascular accidents. The risk for myocardial infarctions and cerebral vascular accidents are increased not only with high plasma glucose levels but also with many other risk factors such as overweight, high blood pressure, and an inactive lifestyle. The increased risk is so great that the Heart and Stroke Foundation of Canada (2006) has different diagnostic criteria for diabetics and nondiabetics for what is considered hypertension. For those without diabetes, blood pressure is considered hypertensive at 140/90mm Hg, whereas those with diabetes are considered hypertensive with a blood pressure of 130/90 mmHg.

Neuropathy. The American Diabetes Association (2006b) reported that "about half (50%) of people with diabetes have some form of nerve damage...and it is more common in those that have had the disease for a number of years" (p. 1). The damage of arthrosclerosis to the larger arteries also causes damage to the smaller arteries. Arthrosclerosis makes the passage of blood to the smaller arteries supplying the nerves inadequate. Therefore, the diabetic can suffer from lack of sensation as well as a feeling of pins and needles and pain in the distal extremities (*Merck Manual of Medical Information*, 2006). The loss of sensation also comes with profound risks because individuals may not notice when their feet are too hot or too cold, when rubbing causing excoriation is occurring, and so on. This leads to decreased blood flow, and nutrients are

unable to reach injured tissues, leading to delayed healing times and a greatly increased risk of infection. Further, the impaired blood flow can lead to problems such as impotence.

Kidney disease. "The kidneys are prime targets of diabetes. Renal failure is second only to myocardial infarction as a cause of death from this disease" (Kumar, Abbas & Fausto, 2005, p. 1201). The exact mechanism by which diabetes causes damage to the kidneys is complex and is beyond the scope of this paper. However, it is necessary for the reader to know that the kidneys play an important role in filtering and cleansing the blood of various toxins. With diabetes, the kidneys become damaged and can lose their ability to filter the blood (CDA, 2006b). Consequently, toxins build up within the blood, and dialysis may be needed to perform the intended function of the kidneys

Eye disease. "Diabetes is the most common cause of adult blindness in the western [*sic*] world" (CDA, 2006b, p. 1). As with other complications, the disturbance in blood flow causes complications. The small arteries that supply the retina become damaged over time and can lead to hemorrhaging or the development of scar tissue. Eventually, this damage can lead to vision loss or complete blindness (*Merck*, 2006).

Hospitalization rates and cost of health care. The comorbidity associated with diabetes leads to both increased hospitalization rates and increased costs of health care. Jacobs, Blanchard, James, and Depew (2000) utilized data from the Manitoba Medicare Database and the Manitoba Diabetes Database to estimate the cost for services for health care for First Nations and the general population, both with and without diabetes. The number of physician visits and hospital admissions for the groups was also assessed. Their findings suggested that diabetic Aboriginals in Manitoba have admission rates to

hospitals 2.74 times that for diabetics of the general population and Aboriginals had higher hospitalization rates than did the general population for most comorbidities.

The financial reality of diabetics is ominous. The CDA (2006d) declared that "people with diabetes incur medical costs that are two to three times higher than those without diabetes. A person with diabetes can face direct costs for medication and supplies ranging from $1,000 to $15,000 a year" (pp. 1-2). First Nations have been reported to have costs associated with diabetes 59% in excess of non-First Nations, when reviewing costs for hospitalization, home services, professional services and outpatient dialysis (Jacobs et al., 2000). Even with this increased expenditure, care is not sufficient.

Mak, Whitehead, and Plant (2004) reviewed the quality of managements of diabetes among Indigenous peoples of the Kimberley region of Western Australia and northern Saskatchewan, Canada. Purposeful sampling was used to obtain 102 participants from Canada and 142 participants from Australia. The participants were patients of various health services within the respective countries. Clinical audits of the participants' charts were reviewed for indications that the health facilities were following the recommended treatment guidelines for diabetes. The findings indicated that the Indigenous communities are not receiving sufficient care, even though more money is being expended, because of the rapid turnover of health care staff, difficult access to specialized and allied medical care, and language and cultural barriers.

The overall medical costs to the Canadian health care system are astonishing. "Diabetes and its complications cost the Canadian healthcare system an estimated $13.2 billion/year and by 2010, it is estimated these costs will rise to $15.6 billion/year" (CDA, 2006d, p. 2). Simpson, Corabian, Jacobs, and Johnson (2003) reviewed the costs of

comorbidity for Saskatchewan residents living with diabetes. Utilizing the (1996) administrative databases of Saskatchewan Health, the researchers identified those with diabetes (sample of 38,124) and traced their health care utilization and cost via billing codes. They found that "36.4% of health care expenditures for people with diabetes was attributable to major comorbidity [and further] diabetes care accounts for 8% of total medical expenditures in Canada" (p. 1661).

Employment and income. The literature was lacking information with regard to the impact of diabetes on employment and, thus, income. The researcher believes that this is because one would assume that with increased morbidity, an inverse relationship would be expected with income and employment. Kraut, Walld, Tate, and Mustard (2001) completed the only study the researcher located for statistics in Canada. Krault et al. utilized a prospective, population-based cohort study in Manitoba, Canada, to compare those with and without diabetes, as well as their employment rates and income. The sample consisted of 25,554 individuals without diabetes and 608 with diabetes (242 of those with diabetes had complications). The data were obtained via a database created through Statistics Canada, the Government of Manitoba, and the University of Manitoba that provided data on the health care systems as well as demographic information. Kraut et al. found that those individuals with diabetes had employment rates two times lower than those without diabetes and that much of this difference was in those with diabetes confounded with complications. Furthermore, the income of diabetics with complications was 72% of the income of individuals without diabetes.

Of interest was the fact that the researchers (2001) did not reach the same conclusion about the Aboriginal population. There did not appear to be a difference in the

rate of employment for those with or without diabetes. In other words, the rate of employment was relatively the same for those Aboriginals with diabetes and those Aboriginals without diabetes. However, it was felt that this was due to multiple reasons, such as a higher baseline of unemployment to begin with and the fact that these individuals faced with diabetes appear to be able to work no longer. It is clear that more research needs to be conducted in this area.

Life expectancy. Major complications of diabetes also come with a shortened life span. The CDA (2006d) estimated, "Life expectancy for people with Type 1 diabetes may be shortened by as much as 15 years. Life expectancy for people with type 2 diabetes may be shortened by 5 to 10 years "(p. 1). Manuel and Schultz (2004) concluded with a similar finding. They determined the health-related quality of life from the 1996/97 Ontario Health Survey as well as the prevalence and mortality of diabetes using data from the Ontario Diabetes Database. They concluded that "the life expectancy of people with diabetes was 64.7 and 70.7 years for men and women, respectively- 12.8 and 12.2 years less than that for men and women without diabetes" (p. 407). It should be noted that Manuel and Schultz were unable to distinguish between Type 1 and Type 2 diabetes. It would be interesting to see what the difference in years of life would be for these subtypes of diabetes. One might assume that in following with the CDA's estimates, the years of life would be less for Type 1 than for Type 2 diabetes.

Screening for Diabetes

According to the CDA (2003), mass screening for diabetes in the general population may not be cost effective because of the relatively low prevalence rate of diabetes. However, the CDA continued that "testing for diabetes in people with risk

factors for Type 2 diabetes or with diabetes-associated conditions is likely to result in more benefit than harm and will lead to overall cost saving" (p. S10). The CDA recommended screening individuals over the age of 40 every 3 years with a fasting plasma glucose (FPG) test, if no other risk factors are present, and earlier and more frequently for those less than 40 years of age, with risk factors present. FPG is a measure of the serum glucose level after an individual has been fasting for 12 hours. Individuals with high readings from the FPG should then be followed up with an oral glucose tolerance test (OGTT) to determine either impaired glucose tolerance or diabetes (CDA).

Young and Mustard (2001) studied the rate of undiagnosed diabetes by taking advantage of recent changes to the Canadian clinical practice guidelines for diagnosis (diagnostic cut-off points were lowered from 7.8 to 7.0 mmol/L for FPG). The researchers found that 2.2% of the adult population in Manitoba were undiagnosed, accounting for one third of cases. Further, those who were undiagnosed had higher blood pressure, obesity indices, and unfavourable lipid profiles. This finding demonstrated the importance of screening individuals who may not be complaining of the signs and symptoms of diabetes.

State of Aboriginal Health

Health Status in General

It is a well-known fact that the health status of Aboriginal populations is often lower than that of Caucasians within the same geographical area and countrywide. Reading (2003) exemplified this point very clearly: "Only 38% of First Nations reported very good to excellent health compared to 61% of all Canadians" (p. 185). Furthermore, the United Nations has ranked Canada as the top country in the world in terms of quality

of life. However, when considering the Canadian Native reserve population, Aboriginals are near the bottom in terms of quality of life, ranking 63rd, below Thailand and Mexico (Reading).

The health of systematically selected individuals (response rate 86%, $N = 1,094$) based on gender and age from randomly selected communities of Ontario First Nations people were compared to those surveyed in the National Population Health Survey (NPHS) by MacMillan et al. (2003). They found that First Nations individuals residing on reserves within Ontario had higher rates of hypertension (22.6% for First Nations vs. 9.7% for NPHS Ontario), heart problems (9.3% vs. 4.7%), breathing problems (8.8% vs. 3.3%), asthma (8.9% vs. 6.1%), and diabetes (14.8% vs. 3.4%). In fact, heart problems, breathing problems, and diabetes rates showed a twofold increase or more compared to the NPHS Ontario population. Overall, chronic health conditions were generally higher among First Nations adults. In addition, the First Nations population had a higher rate for those who had ever smoked, currently were smoking, or had someone regularly smoking inside the house. This was demonstrated by 69% of males and 55% of females indicating they smoke at present, compared to 25% and 33%, respectively, for the NPHS.

The trend of decreased health is not just an adult phenomenon: It appears to start early in life for Aboriginal children. Hanley et al. (2000) completed a study regarding the prevalence of pediatric overweight and associated behaviour factors in Sandy Lake, Ontario, a community known for high Type 2 diabetes rates. Height and weight of 445 children ages 2 to 19 were measured, with overweight being defined as a BMI $\geq$ the 85th percentile. They found that within the Sandy Lake study population, 27.7% of boys and 33.7% of girls were overweight. The study also demonstrated "an inverse association

between overweight and television viewing, fitness level, fiber intake in previous 24 hours, and moderate consumption of junk food in the previous 3 months" (pp. 696-697). By forming such habits early in life, the likelihood of chronic illness is sure to increase. One account by MacMillan, MacMillan, Offord, and Dingle (1996) stated that "approximately one-third [*sic*] of the Aboriginal population in Canada, aged 15 and older, have been informed that they have a chronic physical illness" (as cited in Hoffman-Goetz, Shannon, & Clarke, 2003, p. 476).

Young (2003) reviewed articles from 1992 to 2001 on Medline with regard to Canadian Aboriginal people and found 254 articles that exemplified that research to date has not been conducted in proportion to the demographic makeup of Aboriginal people in Canada, with underrepresentation of certain groups, such as women and children.

Traditional Beliefs

Perceptions of health and well-being. To have a complete understanding of health and illness within a population, one must consider cultural beliefs and values. Taylor, Keim, Fuqua, and Johnson (2005) completed a study to create a diabetes prevention assessment tool for American Indians. Qualitative data from a previous study were utilized to identify cultural perceptions of health and diabetes. From this information, a questionnaire was developed and completed by a convenience sample of 185 American Indians at powwows in Oklahoma. One of the aspects analyzed was their health perceptions. Taylor et al. found that there was a culturally defined definition of wellness that a person is healthy if the person does not have a disease. Further, the study participants felt that "their behaviours did not need to change if they had no physical symptoms of illness" (p. 5).

Thomlinson, McDonagh, Crooks, and Lees (2004), in their study relating to the health beliefs of rural Canadians, found a more holistic approach to defining health. The researchers were interested in seeking a definition of health and illness relevant to rural and northern residents as well as evidence of health-seeking behaviours. The study was ethnographic, consisting of 55 interviews with volunteers ages 19 to 84. Findings from the study demonstrated that being healthy includes a balanced relationship among the physical, mental, social, and spiritual aspects of one's life: Enjoying life, not being bored, and being productive were all included as aspects of health. Furthermore, self-motivation was a key factor in health.

In this respect, one can see the importance of quality and enjoyment of life over just simply living each day and going through the regular motions and routines. However, as with Taylor et al. (2005), the participants in Thomlinson et al.'s (2004) study linked being healthy to not having to go to hospitals or physicians, thus showing a general belief that one has to feel sick to be sick. This could pose problems with health promotion visits such as well women visits because a feeling of sickness is associated with health care professionals.

Bartlett (2005) reviewed Métis women's health and well-being in Manitoba. Bartlett utilized a "quasi-phenomenological tradition on enquiry" to develop an understanding of perceptions of health and well-being. Seventeen women over the age of 25 were broken into two focus groups. Barlett found a more concise definition of health, commenting that "health was most often more reflective of physical issues. Well-being was much broader and holistic...Dimensions include the terms spiritual, emotional, physical, and mental/intellectual" (p. S24).

Perceptions of illness and disease. Beliefs and conceptions of disease are changing among some Aboriginal communities. Ho, Gittelsohn, Harris, and Ford (2006), in their development of an integrated diabetes prevention program with First Nations in Canada, reviewed these changing concepts. Three communities within Northwestern Ontario (NWO), with a total population of about 2,700, that were considered either remote or semiremote, were invited to participate by the researchers. The study was qualitative and quantitative in nature and used ethnography and participatory research. Research collection included group activities, interviews, surveys, and observation of and discussion with the participants.

Ho et al. (2006) noted that in the communities they studied, there was a perceived increase in illness in recent years. It was believed that this could be attributed to "decreased activity, decreased intake of traditional foods, increased intake of fried or processed foods, and increased emotional stress from communal living and breakdown of traditional family structures that had occurred in the past 50 years" (pp. 4-5). Thomlinson et al. (2004) defined what being unhealthy means to rural Canadians, and they concluded that smoking and drinking to excess, being overweight, experiencing a lack of enjoyment, and lacking the strength and ability to do the things one wants to do as factors related to ill health.

Concept of balance. Intertwined with perceptions of health and well-being with disease and illness is the concept of Aboriginal healing. Past experiences such as the experience of residential schools has had detrimental affects on the long-term health of the Aboriginal population. "Many Aboriginal people today express the view that the church-run residential schools did serious damage to their lives and cultures.... The goals

of these schools included education and technical training, but they were, in effect, instruments of assimilation" (Waldram, Herring, & Young, 2004).

Hunter, Logan, Goulet, and Barton (2006) reviewed the regaining of balance and culture among Aboriginals in the context of healing. Their ethnographic study contained a convenience sample of people known to the researchers from an Aboriginal health centre in a city in east-central Canada. In total, 8 Aboriginal participants ages 21 to 79 from various demographic backgrounds were interviewed. Questions focused on the meaning of health, spirituality, and health behaviours. The researchers noted three important themes to Aboriginal healing: (a) following a cultural path (a personal journal of where you have been and where you are going in relation to culture); (b) gaining balance (spiritual, mental, and physical aspects of equal proportions): and (c) the circle of life (sharing knowledge of heritage and identity).

Access to Health Care

Wardman, Clement, and Quantz (2005) surveyed 267 Aboriginals from various rural communities, chosen to represent British Columbia, regarding health care service utilization, barriers to health care use, and health care costs. The participants were recruited via posters. The findings indicated that 86.1% of the participants felt that the health services they require are reasonably accessible, with the exception of dental care, mental health, and medical specialists. However, "almost half of the participants (45.3%) also said that it was necessary for them to travel to another community to access health services" (pp. xxviii-xxix). In contrast to accessibility of health care services, MacMillan et al. (2003) found that only 28% of First National and Inuit people believe that they have

the same level of health services as the rest of Canada. Similar studies were not found for Ontario Aboriginal populations.

Utilization of health care. When health care in general is sought by Aboriginals, the literature suggests that allopathic, Western medicine appears to be the most utilized (Ho et al., 2006; MacMillan et al., 2003, Thomlinson et al., 2004; Wardman et al., 2005). One study suggested that 80.4% of British Columbia Aboriginals utilize either a general practitioner or a walk-in clinic for their primary source of care (Wardman et al.). Ho et al. also noted that additional information is sought in mass media such as magazines, books, pamphlets, the Internet, and family and friends. Traditional healers as well as services provided by Aboriginals are also utilized (Ho et al.; Wardman et al.).

Barriers to health care access. Health care services are only of use to those whom they target if they are accessible and acceptable to the population at hand. Minore, Boone, Katt, Kinch, and Birch (2004) looked at concerns regarding the lack of continuity to health care available to three remote Aboriginal communities in northern Ontario. The study focused on chronic illnesses such as cancer, diabetes, and mental health. Embedded in the study were factors such as resources for health care, including fiscal and human. The researchers found that "presenting symptoms were dealt with, follow-up was not" (p. 364). There was a theme in the literature of the transient nature of health care providers among Aboriginal and rural populations (Minore et al., 2004; Thomlinson et al., 2004). Possible reasons for this transient nature may be lack of cultural awareness, distance from family, geographic isolation, limited educational opportunities, and hours of work. All of these variables could lead to rapid turnovers of health care professionals and a decrease in the continuity of care for Aboriginals. Minore et al. also found that the

continuity of care for Aboriginals varied upon diagnosis, with diabetes having relatively good follow-up and mental disorder follow-up being inadequate. Sustainable funding appeared to play a role with both users and providers of health care, displaying uncertainty for the future of health care programs and initiatives.

> Funding is commonly on a short-term basis. It starts, then stops...episodic funding disrupts continuity of care in two ways. Obviously, programs in which patients are enrolled may terminate. Perhaps less evident, but equally damaging are cases where patients do not take advantage of what is available because they assume that these programs will not last long (Minore et al., p. 365)

Type 2 Diabetes in Aboriginal People

The following section reviews Type 2 diabetes within Aboriginal populations, including beliefs regarding diabetes origin, denial of a diabetic diagnosis, lifestyle changes, and treatment. Please note that the literature reviewed identified a gap in portraying the knowledge that Aboriginals possess with regards to Type 2 diabetes (i.e., signs and symptoms).

Beliefs Regarding Diabetes Origin

There is a clear theme in the literature that Aboriginals believe diabetes to be a "White man's sickness/illness" (Garro, 1995; Public Health Agency of Canada [PHAC], 1997; Young et al., 2000). Garro interviewed 34 participants who had previously been diagnosed with diabetes from an Anishinaabe community in Manitoba, Canada. The participants were interviewed using an open-ended explanatory model framework that asked questions regarding such topics as the cause of the illness, the kinds of effects that it has, and what possible treatments there are. One of the participants from Garro's research stated, "It's the White man's fault. Anishinaabeg never had sugar diabetes" (p.

41). There were variations among the participants about whether diabetes is considered an illness, disease, virus, and so on.

Diabetes is believed to be caused due to a movement away from traditional lifestyles to Western lifestyles (Bruyere & Garro, 2000; Garro, 1995; PHAC, 1997; Young et al., 2000). "The adoption of modern foods and the decline of hunting are widely believed to be the underlying causes" (Young et al., p. 8). Bruyere and Garro completed a study with Opaskwayak Cree Nation, near the Manitoba town of The Pas. A study sampling of 10 men, 10 women and 2 community volunteers with Type 2 diabetes was randomly chosen by staff members of the local health centre who were on their centre's chronic illness registry. Interviews were completed with the participants to elicit the community members' understandings of diabetes. The finding showed that almost all participants (19 of 22) associated diabetes with the lack of wild foods. Furthermore, "factors contributing to the lack of wild foods include pollution and other consequences of white manipulation and destruction of the environment" (Bruyere & Garro, p. 3). The above literature and following quote demonstrate a need to be aware of the cultural meaning that diabetes has within various communities: "While health professionals tend to localize diabetes within individual bodies, the participants viewed diabetes as rooted in collective experience and in historical processes that have impinged on Aboriginal people and are beyond their control" (Bruyere & Garro, p. 3).

Denial of a Diabetes Diagnosis

A feeling of denial is often associated with the diagnosis of diabetes as people want to be like their peers and live how they choose to, without restrictions to diet. Hernandez, Antone, and Cornelius (1999) completed a grounded theory study that sought

to understand how First Nations people with diabetes perceive and live with their diabetes. The study was conducted in a First Nations community in southwestern Ontario. In total, 10 participants were recruited and interviewed by the community health nurses. Hernandez et al. found that those with diabetes wanted to be normal, noting that "the focus on being normal (like others) may be a reflection of the First Nations' cultural desires to live in harmony with nature and cooperation with others" (p. 226). This wanting to be normal was also demonstrated in the denial of a diabetic diagnosis: "I was sort of in denial, I think, I didn't want to believe that I had it [diabetes]: and so I thought, well if I just forget about it, and I don't take my insulin – I don't know – it would go away" (as cited in Hernandez et al., p. 233).

Sunday and Eyles (2001) found a similar characteristic of denial in their study due to such factors as lack of a cure, a feeling of being ashamed, fear, alteration of lifestyle, social consequences, and being labelled as "sick." This point was furthered by a quote from a participant in research conducted by Boston et al. (1997), who commented, "They'll talk about it in my community they'll talk about it as a subject, but they won't necessarily say, 'me, I have it,' you know?....Now slowly they're starting to build up their confidence, but as an individual you keep it hidden" (p. 6).

Lifestyle Changes

Diet was consistently demonstrated within the literature to be a difficult lifestyle tradition to alter (Barton, Anderson, & Thommasen, 2005; Boston et al., 1997; Bruyere & Garro, 2000; Ho et al., 2006; Sunday & Eyles, 2001). The following quote reveals frustration with recommended changes to traditional diets: "We were told to eat a lot of salads. It is so different from our traditional diet...eat more tomatoes, eat more celery, eat

more pears....we don't even have Cree words for those vegetables" (as cited in Boston et al., p. 6).

Changing their diet also burdened Aboriginals with the feeling of not being able to participate in many social traditions, events, and get-togethers (Boston et al., 1997; Ho et al., 2006). Barton et al. (1997) interviewed 8 First Nations individuals (obtained through purposive sampling) living with Type 2 diabetes in the Bella Coola Valley, British Columbia, Canada. The purpose of their study was to obtain descriptive research on the participants' experiences living with Type 2 diabetes. The researchers reported that the participants found it a struggle to reduce portions as well as foods with high sugar and salt concentrations, and to comply with prescribed diets. In any northern, rural, or remote community, suggested foods for a healthy diet can be both hard to access and very expensive. This creates just one more burden to making lifestyle changes in favour of the prevention of Type 2 diabetes.

Timing of lifestyle changes appears to be an issue that needs to be addressed. Taylor et al. (2005) linked being healthy to not having to go to hospitals or physicians, thus showing a general belief that one has to feel sick to be sick. This has serious implications for lifestyle modifications. Are people going to change their habits and ways of life if they do not feel sick, especially if doing so means not following traditional ways of life and feeling socially isolated? This must be taken into consideration when designing prevention and early intervention strategies. Strategies may be better accepted when they do not make the individual feel "different" from others. Instead, strategies for prevention and early intervention should relate to a feeling of normalization for those

being targeted, and they should be incorporated into "normal" everyday things such as local bingos and school or community events.

Treatment

Barton et al. (2005) noted that both Western and traditional medicines are common for the treatment of diabetes for Aboriginals living in rural Canadian communities. Western treatment included "regular checkups, education about their health, and the monitored treatment of diabetes. From a traditional perspective, this included the use of food and medicinal plants, and ceremonial practices such as healing circles" (p. 243). Therefore, with such a mix of therapeutic choices, it is necessary for health care providers to have an understanding of both Western and traditional practices in order to provide culturally appropriate care.

Prevention of Type 2 Diabetes

Many of the risk factors for Type 2 diabetes, such as diet, exercise and weight, are modifiable. Preventing diabetes by adopting a healthier lifestyle appears to be effective and can greatly reduce its incidence (Hu et al., 2001; Knowler et al., 2002). Hu et al. followed 84,941 female nurses from 1980 to 1996 from the Nurses Health Study, who at baseline, were free of cardiovascular disease, diabetes, and cancer. The researchers obtained information from the participants with regards to their diet and lifestyle. Over the course of the study, 3,300 new cases of Type 2 diabetes were diagnosed. Being overweight or obese appeared to be the single most important risk factor for the development of diabetes. Other identified risk factors were lack of exercise, poor diet, and current smoking.

Knowler et al. (2002) randomly assigned 3,234 nondiabetic participants with elevated FPG and elevated glucose tolerance to either a group to undergo lifestyle modification with a goal of decreased weight and increased physical activity or a group to take metformin (850 mg twice daily). The groups were followed for an average of 2.8 years. The lifestyle modification group had a significantly reduced incidence of diabetes by 58% (95% confidence interval), and the group that took metformin had a decreased incidence by 31%. Therefore, the lifestyle modification was much more effective than metformin in preventing diabetes.

Burnet et al. (2005) completed a meta-analysis utilizing MedLine. The researchers reviewed a total of 7 papers, 4 major diabetes prevention trials using lifestyle modifications, and 3 using prophylactic medications. They found that the lifestyle modifications appeared to have a much greater impact on the prevention of diabetes and should, therefore, be the first-line strategy. The findings also suggested that preventative measures can be conducted at costs generally acceptable to society. However, for preventative programs, resources, and messages to be effective, the literature repetitively speaks to the need for preventative measures to be culturally appropriate as well as developed with the participation of the community (Bartlett, 2005; Barton et al., 2005; Bisset, Cargo, Delormier, Macaulay, & Potvin, 2004; Cargo et al., 2003; Daniel & Messer, 2002; Griffin, Gilliand, Perez, Upson, & Carter, 2000; Hernandez et al., 1999; Ho et al., 2006; Macaulay et al., 1997; Potvin, Cargo, McComber, Delormier, & Macaulay, 2002; Roubideaux, Moore, Avery, Muneta, Knight & Buchwald, 2000; Saksvig et al., 2005; Satterfield et al., 2003; Struthers, Hodge, De Cora & Geishirt-Cantrell, 2003; Taylor et al., 2005). "Interventions with community members

participating during planning, among other phases are more likely to be responsive to community needs, gain community support, elicit local action and foster feelings of community ownership" (Bisset et al., p. 317). Acceptance to change was also considered to increase when preventive measures to change social norms were presented in multiple institutions such as schools, churches, health departments, workplaces and ethnic organizations (Ho et al.; Satterfield et al.).

Finally, health care professionals must be proactive with preventative information and education, and relate this information in a culturally appropriate manner (Burnet et al., 2005; Thomlinson et al., 2004; Young et al., 2000). One source of aggravation from communities noted in the literature was the transient nature of health care professionals in rural settings. Recommendations and actions need to be set to encourage long-term durations of health care professionals in communities (Thomlinson et al.). Recommendations could include such things as fiscal rewards for long durations of stay, educational leaves, and locum availability.

Gaps in the Literature

The information gathered on the knowledge, attitudes, and beliefs of Whitefish Bay residents pertaining to Type 2 diabetes will be utilized by the community to develop a diabetes prevention program that is culturally suited to the target population. As stated by Bartlett (2005), "Little academic effort has been expended for research on the meaning - conceptions and dimensions - of the Aboriginal health and well-being for the purpose of program development" (p. S25). The researcher hopes to help fill this void for Whitefish Bay and provide basic demographic information; assess samples of blood collected by the

local health centre; and analyze the current knowledge, attitudes, and beliefs of Whitefish Bay residents in order to identify subgroups at risk.

Summary

Within the literature review, several aspects of Type 2 diabetes were discussed. It was made clear that this disease is an ongoing and growing problem not only for the general population but especially for the Aboriginal population. The implications of a diagnosis of Type 2 diabetes impact the individual, the family, and the community. The individual's diagnosis carries a "sick" label that may come with guilt and shame. Alterations in lifestyle are necessary to prevent devastating complications, but these changes are often not easy to make and lead to a feeling of alienation among peers. The community is affected in several ways, including a shrunken workforce, lost income for the community, and increased costs of health care. It is the view of the researcher that diabetes cannot be blamed primarily on the individual or the community. In an effort to combat Type 2 diabetes, environments must be conducive to achieve optimum health and must take into account all aspects of the determinants of health. The individual must also take responsibility to lead the healthiest lifestyle possible, including a healthy diet, exercise, and stress reduction. A review of the community's health services' effects on diabetes follows in a needs assessment.

CHAPTER 3: NEEDS ASSESSMENT

Introduction

Because Whitefish Bay has a small population and needs to utilize services from larger centres within the north, in order to determine both gaps and redundancies with regard to Type 2 diabetes services, a needs assessment was completed for Northwestern Ontario (NWO). The needs assessment was broken down into social forces (patient trends, demographic and population trends, and environmental forces); political forces (trends in health care and health professionals); and regulatory forces (mandatory food labelling and physical education). An overview of services available for the prevention of Type 2 diabetes (primary, secondary and tertiary) in Whitefish Bay is available in Appendix A.

Social Forces

Patient Trends

The CDA (2006d) stated that "more than 2 million Canadians have diabetes and of these 90% are Type 2 diabetes" (p. 1). As cited by the CDA, in 2000, "the World Health Organization estimated that over 177 million people have diabetes and by 2025, this figure will top 300 million: (p. 1). Clearly demonstrated, diabetes is on the rise, but why? The CDA attributes this increase to a number of factors:

- "The population is aging.
- Obesity is on the rise.
- Canadians' lifestyles are increasing sedentary.
- Aboriginal people are three to five times more likely than the general population to develop Type 2 diabetes.

- 77% of new Canadians come from populations that are at higher risk for Type 2 diabetes. This includes people of Hispanic, Asian, South Asian or African descent.
- There is a growing incidence of Type 2 diabetes in children from high-risk populations. Recent data suggests an American child born in 2000 stands a one in three chance of being diagnosed with diabetes in his or her lifetime" (p. 1)

Demographic and Population Trends

Whitefish Bay (Naotkamegwanning Anishnawbe) is located 50 kilometres southeast of Kenora, Ontario, off Highway 71. According to statistics from Indian and Northern Affairs Canada (2006), 628 people live on reserve.

Health care on the reserve in Whitefish Bay began in 1953 in a trailer located in a local resident's yard. In 1970, the health centre moved to a trailer at its current location at the east end of the reserve. Community health feasibility studies began in 1997, and in 1999, Whitefish Bay became a transfer community for health services. A board of directors manages the health centre and reports to the Band Council (N. White, personal communication, May, 2006).

Several health professionals provide services through the health centre, including physicians, a nurse practitioner, nurses, a national native alcohol and drug abuse program worker, a mental health worker, a youth worker, an Elder worker, a community health representative, a dentist, and a diabetes educator (P. Copenace, personal communication, May, 2006). Several programs are run out of the clinic, including primary care, immunizations, sexual health, infectious disease surveillance, prenatal education,

postnatal well baby visits, home care programs, and diabetes education (P. Copenace, personal communication).

While in Whitefish Bay, the researcher asked some of the health centre staff what they perceived to be barriers to health care for the residents of Whitefish Bay. The following list was stated:

- Long waits for access to health care.
- Healthy food is expensive and difficult to obtain locally.
- Funding for health care services.
- Insufficient human resources (physiotherapists, occupational therapists. etc.).
- Weather in the winter makes the hour drive to the nearest centre (Kenora) difficult and dangerous at times.
- Housing – many houses are in need of repair, and mould in particular is a problem. (personal communication, May, 2006)

Health centre staff provided many aspects of health promotion that were also occurring in the community to increase the status of health of the residents:

- Suicide prevention program.
- Opening of the school gym until 4 a.m. on weekends to provide social and physical activities for the children.
- Water quality testing on a regular basis.
- A "Youth and Elder Centre" utilized for social gatherings, community events, and so on.
- Women's shelter for women and their children to seek refuge, as seen fit, from abuse of all kinds.

- Aboriginal Head Start that provides child care in Ojibway to young children to increase cultural awareness and traditional ways of life.
- A strong sense of community and family. (personal communication, May, 2006)

The Northwestern Health Unit (2006) outlined the population it serves: "Residents served by the Northwestern Health Unit reside in municipalities, First Nation communities and unorganized areas within the Kenora-Rainy River District" (p. 1). It should be noted that specific statistics just for Whitefish Bay are not available. NWO has unique demographics that affect the health of individuals, families, and the community as a whole. Whitefish Bay is no exception to this. For example, individuals in Whitefish Bay who need specialist care (e.g., care from a cardiologist) need to travel several hours to the nearest urban centre. The closest centre for Whitefish Bay residents is Winnipeg, Manitoba. This has several implications, such as travel costs, accommodations, and lack of social support while outside of the community. Even a visit to the nearest emergency room involves an hour commute to Kenora, Ontario. Further, many residents do not have a mode of transportation. Whitefish Bay Health Centre does provide transportation to and from medical appointments in Kenora and Winnipeg, but the demand for this service is high and often leads to many hours of waiting before or after the appointment. Please see Table 2 that compares demographics and population trends for the Northwestern Health Unit's population to the Province of Ontario.

Environment Forces

NWO has a unique environment in which families live. Communities vary greatly. NWO has a number of communities that are very isolated from larger centres. This often leads to a feeling of disconnect. Access to services that may be well provided

in larger centres, such as in southern Ontario, are often lacking in the north. Even when the services are provided, transportation and distance needed to travel can often be a barrier for those who need the services the most. The north is largely blue collar. A lack of income for families can often lead to substandard housing and inadequate nutrition due to a lack of financial resources.

Political Forces

Trends in health care. Our universally accessible health care system clearly represents Canadians' sense of community, and it has become a valued, integral part of our identity (Registered Nurses Association on Ontario [RNAO], 2001). "Our health care system is built on five principles set out by the Canada Health Act in 1984: accessibility, universality, comprehensiveness, public administration, and portability" (RNAO, p. 4).

Table 2

Demographics for NWO and the Province of Ontario

Characteristics	Northwestern Health Unit			Ontario		
	Total	Male	Female	Total	Male	Female
Population in 2001	77,823	38,865	38,955	11,410,050	5,577,055	5,832,990
1996-2001 population change (%)	-3.0	-	-	6.1	-	-
Population density per sq km	0.5	-	-	12.6	-	-
Aboriginal Population identity	18,945 or 24.5%	-	-	188,315 or 1.7%	-	-
% of population aged 20-34 with less than a high school graduation	28.7 Note: this higher averaged than ON continues throughout all ages.	32.2	25.3	13.2	14.9	11.5
Average earnings (all persons with earnings) $	30,049	36,683	22,472	35,185	42,719	26,894
Unemployment rate	9.7	10.8	8.3	6.1	5.8	6.5
Obesity	17.0	19.5	14.4	14.8	16.0	13.7
Smoking status	27.2	26.6	27.8	22.1	24.9	19.4
Contact with a medical doctor	74.5	68.1	80.9	81.1	75.9	86.1

Note. From "Community Highlights for Northwestern Health Unit," by Statistics Canada, 2005a, Adapted – no further permission required from author.

Health needs in Canada have evolved. There has been an epidemiological shift of the health care needs of the population. Chronic conditions and disabilities, not infectious disease, dominate our needs (Dickinson & Bolaria, 2002). For example, the highest mortality rates used to be due to infectious diseases such as tuberculosis and measles. Now, years of life have expanded because of increased immunizations, clean and sterile techniques, and so on. However, now we have high rates of chronic illnesses such as diabetes, cardiovascular disease, and pulmonary illnesses. Preventive care must be emphasized, and "disease prevention, as well as education related to personal health

practices, will reduce the need for, and consumption of curative care" (Canadian Nurses Association [CNA], 2001, p. 9). Type 2 diabetes prevention is a prime opportunity to practice primary and secondary prevention, thus reducing the burden to the health care system in subsequent years.

There has been an effort in recent years to renew the health care system in Canada. Several reports have been released on the reform of health care. Recently, the first ministers met to develop a 10-year plan to strengthen health care. From this meeting, it was determined that the greatest concern across Canada is access to timely care. In order to increase access, the ministers set several goals, including:

- Reduced waiting time and improving access.
- Increase the supply of health care professionals.
- Provide coverage for certain in home care services.
- Primary care reform.
- Increase access to care in the north.
- National pharmaceuticals strategy.
- Increase prevention, promotion, and public health.
- Accountability and reporting to citizens. (Health Canada, 2004)

The goal to increase prevention, promotion, and public health may have a large impact on the prevention of Type 2 diabetes and, thus, the future health of Canadian citizens as a whole. Access to primary, secondary, and tertiary prevention of Type 2 diabetes may be greatly increased in Ontario with the integration of the new family health teams (Ministry of Health and Long-Term Care [MHLTC], 2005) and the Local Health Integration Networks (LHINs). The family health team is a new approach to primary

health care that brings together different health care providers (family doctor, nurse practitioner, registered nurse, dietitian, and pharmacist), each utilizing his/her skill sets to coordinate the highest possible quality of care. These teams will ensure that patients get the care they need, when the need it, by appropriate health care professionals in their own communities.

For example, a diabetic patient may receive nutritional counselling from a dietitian, drug information from the pharmacist, general health care provided by the nurse practitioner, and more complex health care provided by the physician. Those at risk of diabetes or those who are already diabetic will be able to get diagnostic testing, physicals, and health education all under one roof by the most appropriate health care provider, thus increasing access to and, most likely, utilization of care. However, one must take into consideration that residents of very small rural communities would likely still have to travel for this service or would have limited access to professionals (physicians, nurse practitioners, and addictions counsellors), who may come to the community, for example, one day of the week.

LHINs have been developed to plan, integrate, and fund local health services in 14 regions across the province of Ontario. LHINs "are based on a principle that community-based care is best planned, coordinated and funded in an integrated manner within the local community because local people are best able to determine their health service needs and priorities" (MHLTC, 2006, p. 1). The goals of the LHINs are to engage people within their communities and increase access to needed health care services.

Health professionals. Throughout the health care system reform debate, there has been much discussion with regard to access to health care. The National Physician

Survey (The Royal College of Physicians and Surgeons of Canada, 2005) demonstrated the need for an influx of physicians into the system. Sixty percent of family physicians involved stated that they limit the number of new patients into their practice or are not accepting new patients at all. Trends within NWO are devastating when one reviews the need for family physicians. At the time of the writing of this paper, Health Sciences North, an organization that provides health professional education and recruitment and retention strategies for the north, demonstrated the need for more than 48 family physicians through their service areas, including the communities of Atikokan, Dryden, Fort Frances, Geraldton, Kenora, Ear Falls, Red Lake, Sioux Lookout, Thunder Bay, Longlac, Ignace and Wawa (Health Sciences North, 2006). These numbers are likely on the conservative side.

Nurses are no different in terms of a large shortage occurring within the health care system. A report released by the RNAO (2002) projected a national nursing shortfall of 113,000 nurses by 2016. As of 2005, there were 108,943 registered nurses in Canada; of these, only 89,648 were working (RNAO, 2005, p. 1). Over the next decade, several thousand nurses will have to be added each year to the workforce. The shortfall of nurses is already here, and the situation will only get worse over time if current trends continue.

Nurses play a key role in education and health promotion. The massive forecasted shortfall will greatly impact health care, leading to a decrease in the quality of care, focusing on acute needs rather than preventative measures. Such shortages of health care professionals can lead to dissatisfaction within the workforce: longer hours, more responsibility, and unsafe working conditions. Suddenly, the health care profession could be facing a negative view from potential health care providers, leading to a decrease in

recruitment, not to mention that those already within the health care profession may leave, leading to retention issues.

Regulatory Forces

Nutrition labelling. Diet was consistently demonstrated within the literature to be a difficult lifestyle tradition to alter (Barton et al., 2005; Boston et al., 1997; Bruyere & Garro, 2000; Ho et al., 2006; Sunday & Eyles, 2001). In a sea of prepackaged foods and healthy diet claims, picking out a nutritious meal can be daunting at the best of times. Health Canada (2006), through the Food and Drugs Act, regulates the labelling of food products in Canada, including the mandatory labelling on most food labels, updated requirements for nutrient content claims, and diet-related health claims for foods. These regulations became mandatory for large manufacturers on December 12, 2005 (Health Canada). As stated by Health Canada, it is hoped that "Improved nutrition labelling on most pre-packaged foods; science-based health claims and defined nutrient-content claims can help consumers make informed choices about the foods they buy and eat" (p. 1). These regulations, coupled with education, are very significant supports to improved public health in Canada (Health Canada). Time will tell if these new regulations will make a difference to the primary and tertiary prevention of Type 2 diabetes.

Exercise. A second area in which regulatory forces may help in the fight against Type 2 diabetes is exercise. As stated earlier, one of the barriers to exercise is being able to fit the time to exercise into an already busy day. It is possible to view some solutions that could be regulated. For example, regulating a certain amount of time each day for mandatory participation in physical activity for school children, from kindergarten

through to graduation from high school, may help to form lifelong habits. This could be continued by encouraging physical activity in the workplace with added incentives. Incentives could be 15 minutes of work time/day devoted to exercise or a monetary amount per year to be used toward equipment for exercise (e.g., running shoes). One must consider, however, that financial constraints may impede such solutions. Therefore, programs that are developed should take this into consideration, and efforts would be needed to secure the necessary funding for such programs.

Summary

A thorough search was done to determine the services available to the residents of Whitefish Bay with regard to the primary, secondary, and tertiary prevention of Type 2 diabetes. There is a lack of data with regard to Whitefish Bay as an individual community; therefore, the information provided reflected the geographic are of NWO as a whole, as defined by the population served by the Northwestern Health Unit. To say the least, services are lacking. The majority of the services available to the residents of Whitefish Bay require, at minimum, travel to Kenora. Larger centres such as Thunder Bay and Winnipeg (out of province) have expanded services but come with many barriers, such as travel, poor weather, meagre finances, time away from family, and absence from work. With such barriers, access is greatly reduced, and health is in jeopardy. Resources from some of the agencies in the community offer prevention measures, such as mass media campaigns. Others provide counselling or clinical health care.

Health care services for those with Type 2 diabetes in the rural and remote north are fragmented. Physicians are often relied upon to deliver services. However, many

individuals do not have family physicians and locums are limited. There is a need for health care agencies and community organizations to take a leadership role within Whitefish Bay to provide the appropriate primary, secondary, and tertiary prevention of Type 2 diabetes. In doing so, the services will be "made for the community" and will be suited culturally to the knowledge, attitudes, and beliefs of the population at hand, allowing educational materials to be culturally appropriate and responsive to the community's needs.

There has been a vast amount of research conducted on various aspects of Type 2 diabetes prevention. There is a clear indication that health care professionals believe that Type 2 diabetes prevention is of benefit to both the individual and the community. However, even with the large amount of research, more is needed to perfect the provision of Type 2 diabetes prevention and to make it more culturally and community specific.

CHAPTER 4: METHOD

Research Design

The study was quantitative in nature and utilized a cross-sectional design. This design was well suited because cross-sectional designs are descriptive in nature. Cross-sectional designs collect data at one point in time, generally in the form of surveys. Prevalence estimates can be obtained, thus demonstrating the magnitude and distribution of a health problem. Furthermore, hypotheses can be generated and interventions planned (Friis & Sellers, 2004). To collect the data, the researcher utilized an exploratory survey approach.

> Surveys collect detailed descriptions of existing variables and use the data to justify and assess current conditions and practices or to make more plans for improving health care practices...Investigators may use a descriptive or exploratory survey design to search for accurate information about the characteristics of particular subjects, groups, institutions, or situations or about the frequency of a phenomenon's occurrence, particularly when little is known about the phenomenon. (LoBiondo-Wood & Haber, 2002, p. 223)

Within the questionnaire (see Appendix B), the participants were asked to provide demographic information with regard to age, income level, level of education, and gender. The knowledge, attitudes, and beliefs regarding Type 2 diabetes of Whitefish Bay residents over the age of 18 were assessed utilizing mainly Likert scale questions. Questions sought to identify the respondents' awareness of the signs and symptoms, risk factors, complications of diabetes to develop an understanding of the knowledge base. To assess the participants' attitudes and beliefs, questions revolved around the cause of diabetes, feelings associated with a diabetic diagnosis, and fear of diabetes. The tool was reviewed by the Whitefish Bay Community Health Centre for cultural appropriateness. In

addition, the tool was reviewed by a nurse researcher (Dr. Darlene Steven, professor at Lakehead University) and members of the Ethics Review Board of Lakehead University

Naotkamegwanning Health Services collected casual blood glucose levels (performed approximately 2 hours after eating) from individuals in the community during April and May 2006. Consent was obtained from the Naotkamegwanning Health Services for the community and from each individual participant. The researcher analyzed the findings. These results were separate from the questionnaire. Those who filled out the questionnaire were not also asked to have their glucose levels measured, and explicit consent for the survey was obtained through written consent from the researcher. The data obtained from the glucose level were recorded on a table with the participant's name, a number (to indicate how many had been screened), and the plasma glucose level. The blood glucose monitor utilized was maintained, calibrated, and operated by the Naotkamegwanning Health Services.

Setting

The sample consisted of residents of Whitefish Bay First Nation aged 18 years and over and who are clients of Naotkamegwanning Health Services Clinic. Both those who were diabetic and those who were not diabetic participated in the study. No distinction was made between the two.

Sample

A convenience sample was utilized for the study. This method of obtaining a sample was chosen for the following reasons. A convenience sample is based on availability and accessibility. The trade-off for having a sample that is achieved through convenience is the possibility of a sample that is not representative of the population as a

whole. Participants were Whitefish Bay residents over the age of 18 years. This was the most cost-effective and accessible manner for the researcher to obtain participants. Naotkamegwanning Health Services Clinic is the only primary health care facility on the reserve. Therefore, the participants were users of the clinic, and all people on the reserve would have to access the health centre for their entry to the health care system. The participants were asked to fill out a survey while waiting for their health appointment at the clinic or were asked to fill out the survey at either their annual Treaty Day Celebration or annual Spring Feast (gathering of community members for a meal to celebrate the arrival of spring and the closure of winter). All data were collected between April 24, 2006, and May 24, 2006.

Data Collection

Ethical approval from Lakehead University was sought before the collection of any data. The researcher submitted an application to the Ethics Review Board at Lakehead University. This process involved submitting an application with regard to the intent of the research and how this researcher planned to make the research ethical by meeting standards of confidentiality, consent to participation, storage of data, and so on. The researcher also completed an online course that reviewed aspects of ethical research.

Before any research took place, approval was granted to the researcher by Lakehead University. Further, consent was sought and awarded by the Naotkamegwanning Health Services Clinic Board of Directors and the Band Council to proceed with data collection from local residents. Prior to data collection, the potential participants were verbally told the purpose of the study, were provided with a cover letter (see Appendix C), and were asked to sign a consent form (see Appendix D). Some

participants chose not to sign the consent form, following the oral tradition of the First Nations culture. It is tradition in many Aboriginal communities to pass knowledge and history on via verbal communication rather than through written communication. In this case, verbal consent was obtained, and the researcher wrote the client's name on the consent form and recorded "verbal consent given." The participants were made aware that all information will be kept in strict confidence and in a locked cupboard at Lakehead University for a period of 7 years, as per regulations of the Tri-Council guidelines. The participants were also told that they may withdraw at any time from the study and may choose not to answer questions without consequence.

Survey Instrument

Participants were asked to complete a questionnaire (see Appendix B) that was developed by the researcher after reading the relevant literature based on a philosophical foundation of the health belief model (HBM). To improve validity, the questionnaire was reviewed, and suggestions were made by the relevant health care professionals (Whitefish Bay nurses, community health representative, and lay home visitors) for appropriate content. The survey was then forwarded to Naotkamegwanning Health Services for their review of its cultural appropriateness. The survey was piloted with five residents of Whitefish Bay who recommended removing questions 6 and 7 pertaining to the main source of income and annual household income, respectively, because they felt that these questions would not be well received and would deter people from filling out the surveys. Many people may not want to share this information and may feel embarrassed or that there is no need to share such personal information.

The first section of the questionnaire pertained to demographic data, namely, gender, age, and level of education. The second portion of the questionnaire pertained to the residents' knowledge, attitudes, and beliefs about Type 2 diabetes, and was answered via a 5-point Likert scale. The questionnaire had an option labelled "Not Sure" on several of the questions to decrease guessing and increase the reliability of the questionnaire.

Naotkamegwanning Health Services was responsible for the collection of the casual glucose samples and the calibration of the glucose monitor utilized. Naotkamegwanning Health Services collected casual blood glucose levels (performed approximately 2 hours after eating) from individuals in the community during the months of April and May. Calibration of the glucose monitored utilizing the manufacturer's instructions. The only demographic information collected from Naotkamegwanning Health Services was the name of the participants in order to contact the participants should a glucose reading be high. Information such as weight, age, gender, and BMI was not collected. The researcher analyzed the findings.

Data Analysis

The nature of the data collected from the questionnaires was quantitative. The researcher entered the data into SPSS and then utilized the program to compute descriptive statistics for demographics and frequency of responses. To determine differences between groups, the chi-square test (for nominal level data), *t* statistic (for interval level data) and analysis of variance (ANOVA) were utilized. Various groups within the population were analyzed to determine if there was any variance in knowledge, attitudes, and beliefs among these defined groups, including different gender, age, education level, language most often spoken in the home, current employment status,

marital status, family history of diabetes, and screening for diabetes in the past. A probability of $\leq .05$ was considered significant. Relationships between variables were assessed with the Pearson correlation coefficient.

Casual plasma glucose samples collected by Naotkamegwanning Health Services were analyzed for frequencies. Frequencies that were of the most interest to the research were those that were consistent with impaired glucose tolerance and levels that were close to but under the current guidelines for impaired glucose tolerance and could be a predictor of diabetes in the future.

CHAPTER 5: RESULTS

Demographics

One hundred and seventy-five (175) residents over the age of 18 years completed the questionnaire. According to Indian and Northern Affairs (2006), 628 people live on the Whitefish Bay reserve. Statistics provided by the Naotkamegwanning Health Services Clinic (2004) show that 303 of the 628 people are 20 years of age or older. The researcher only surveyed those 18 years of age and older, resulting in a sample of approximately 55% of the total eligible population. A total of 195 people were asked to complete the survey, and of these, 175 agreed to complete the survey, making the response rate 90%.

Age

According to Indian and Northern Affairs (2006), 52% of the population is male, and 48% is female. The valid percent of females who completed the survey was 60% (97 participants) and 40% for males (65 participants). However, 13 participants did not state their gender. The ages of the participants were fairly representative of ages of the residents provided by Naotkamegwanning Health Services Clinic (2004). The ages of the participants is listed in Table 3.

Table 3

Frequency of Age Categories

Age (in years)	Number and % of participants	Community population distribution for on-reserve residents
18-30	44 (25.4%)	74 (24.2%)
31-40	59 (34.1%)	100 (33.1%)
41-50	33 (19.1%)	43 (14.2%)
51-60	18 (10.4%)	41 (13.6%)
61-70	17 (9.8%)	32 (10.6%)
71-80	1 (.6%)	9 (3%)
81 and over	1 (.6%)	4 (1.3%)

$N = 173$

Education

A large number of respondents (65, or 32.8%) had either some college or university or had completed college or university. The level of education obtained by the participants is displayed in Figure 2. The reader should note that participants were placed in the highest category of education they had participated in, but this does not equate to their obtaining a degree, diploma, and so on. Being entered into a specific category simply meant that some of this education level was obtained. For example, a person who completed Grade 9 was entered into the secondary level category, as was a person who completed high school, but did not go on to achieve any other education.

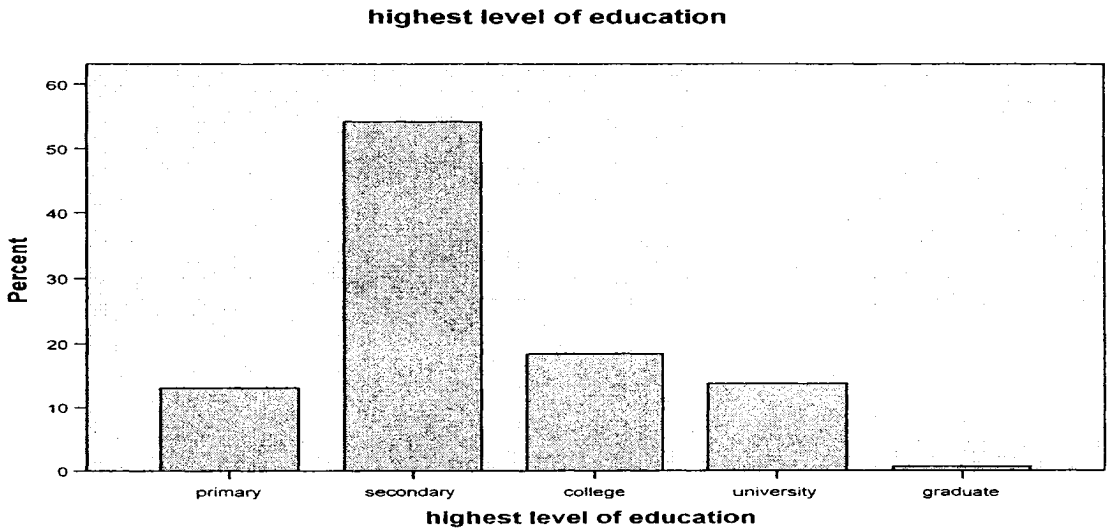

Figure 2. Self reported highest level of education obtained.

Employment Rate

The unemployment rate on the reserve was high at 70 participants (40%). The questionnaire did not determine if this was due to circumstance or choice. This is very high in comparison to the northwestern region in general. Statistics Canada (2005a) gave an unemployment rate for the northwestern region of 9.7%.

Language

The respondents were asked to identify their primary language spoken in the home. The responses showed that 38 (21.7%) mainly speak Ojibway in the home, 60 (34.3%) speak English, 76 (43.4%) speak both English and Ojibway most often in the home, and one participant (.6%) speaks primarily French in the home.

Marital Status

The majority of those surveyed were either single (49, valid percent of 34.8%) or living common law (45, valid percent of 31.9%). There was a very low separation/divorce rate of 11 (valid percent of 7.8%). It should be noted that 34 (19.4%) respondents did not respond to this question, probably because of the placement of this question on the questionnaire. As stated earlier, two questions were removed from the survey that pertained to income. These two questions were at the top of the page, and the question related to marital status was right below these. Due to limited resources, the initial questionnaires that were printed were utilized with the two questioned that "were not to be asked" crossed out. Participants may have seen these two questions crossed out and assumed to continue on to the next page, thus missing the marital status question.

Family History and Previous Screening

Both knowledge of family history and identification of being screened in the past for diabetes were left blank by the participants 20% and 18% of the time, respectively. However, of those who did answer, 102 (73%) have a family history of diabetes and 86 (60%) have been screened for diabetes in the past.

Knowledge, Attitudes, and Beliefs

When asked to state if they agreed with a simplified definition of Type 2 diabetes ("Type 2 diabetes is when you do not produce enough insulin or when the body does not use the insulin that the body makes very well"), only 90 (55%) of the participants either agreed or strongly agreed; a large number of respondents 71(43%) were not sure. The participants were generally aware that diabetes is on the rise, with 140 (80%) agreeing or disagreeing with the above statement; however 34 (20%) were not sure. When asked if an individual will always have signs and symptoms of diabetes, 108 (63%) agreed or strongly agreed, and only 25 (16%) disagreed or strongly disagreed. The rest of those questioned 37 (21%) were not sure. The participants were well informed that diabetes can cause complications in other parts of the body, with 142 (82%) either agreeing or strongly agreeing. They were fairly equally divided in their beliefs that if someone in the family has diabetes, others will most definitely also get diabetes, with approximately one third (30%) either agreeing or strongly agreeing and approximately one third (35%) either disagreeing or strongly disagreeing; the rest remained undecided (35%).

Generally, the participants felt that both being overweight (151, 86%) and eating too much sugar (131 75%) cause diabetes, respectively. There is a clear theme in the literature that Aboriginals believe diabetes to be a "white man's sickness/illness" (Garro, 1995; PHAC, 1997; Young et al., 2000). The changes in eating habits due to the changing culture and choice of foods all lead to increased sugar in the diet and increased weights in general.

There was confusion as to whether a lack of exercise could cause diabetes; 122 (70%) agreed or strongly agreed that a lack of exercise could cause diabetes, whereas

53(30%) either were not sure, disagreed, or strongly disagreed. There is clear evidence in the literature that lifestyle modifications leading to an increase in exercise and weight loss greatly reduce the risk of developing diabetes.

The majority of participants felt that diabetes could be prevented, with 131 (76%) agreeing or strongly agreeing, 31 (18%) unsure, and 10 (6%) either disagreeing or strongly disagreeing that diabetes could be prevented. In relation to the health belief model, if the participants felt that diabetes could be prevented and that there was sufficient reason to prevent diabetes, lifestyle modifications were most likely to occur and be successful.

Twenty-three participants (13%) felt that it was shameful to have diabetes; however, 25 (14%) were undecided, and the other 127 (73%) disagreed or strongly disagreed that it was shameful to have diabetes. Similar in manner to this question was if participants were afraid to be screened because they would not want others to know if they had diabetes. The results showed that 25 (18%) either agreed or strongly agreed, 29 (17%) were not sure, and the other 121 (69%) disagreed or strongly disagreed. Further, 78 (46%) agreed or strongly agreed that they felt they were at risk of getting diabetes in the next 10 years, with 74 (43%) not sure.

One hundred and nine (62%) either agreed or strongly agreed with the statement "First Nations people get diabetes if they eat junk food (fast food, pop, chips, etc.)," and 49 (28%) agreed or strongly agreed that "if you eat traditional food (berries, roots, wild meat), you will not get diabetes." This relates back to the changing diets that are more in line with Western foods and a belief that diabetes is a "white man's illness."

Table 4 summarizes how the participants felt that diabetes impacts lifestyle. The statements in the left-hand column were provided for the participants to state their level of agreement via Likert scales. Less than 20% felt that having diabetes meant that the individual could no longer do things that he/she enjoys or that diabetes makes it hard to take part in traditional events, determined by adding the frequencies for those who strongly agreed with the statements and those that agreed with the statements. The effect that participants felt diabetes has on food choices was clear, with 77 (44%) agreeing or strongly agreeing that one can no longer eat the foods that one wants to.

Table 4

Effects of Diabetes on Lifestyle

Statement	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. Having diabetes means you can no longer eat sweets.	13 (7.5%)	46 (26.4%)	50 (28.7%)	61 (35.1%)	4 (2.3%)
2. Having diabetes makes it hard to take part in traditional events and celebrations (sweats, fasting, etc.)	4 (2.3%)	29 (16.6%)	51 (29.1%)	63 (36%)	28 (16%)
3. Having diabetes means you can no longer eat the food that you want to	17 (9.8%)	60 (34.5%)	51 (29.3%)	41 (23.6%)	5 (2.9%)
4. If you have diabetes you can no longer do the things that you enjoy doing	5 (2.9%)	27 (15.4%)	43 (24.9%)	75 (43.4%)	23 (13.3%)

N = 175
n = 174 (Item # 1 & 3)
n = 173 (Item # 4)

The participants were asked to check the boxes they felt were risk factors for diabetes, signs and symptoms of diabetes, and complications of diabetes. Table 5 summarizes the responses. Risk factors for the development of diabetes include family history; membership of a high-risk group (Aboriginal, Hispanic and so on); birth to a

large baby; gestational diabetes; increasing age; being overweight; and so on (CDA, 2006a). The respondents were fairly well versed in the risk factors for Type 2 diabetes, with 122 (70%) or more recognizing that being overweight, not exercising, having a family history of diabetes, and eating sweets are risk factors. However, only 53 (30%) and 43 (25%) felt that increasing age and being of First Nations ancestry, respectively, are risk factors.

Signs and symptoms of diabetes include unusual (increased) thirst, changes in weight, extreme tiredness or lack of energy, blurred vision, frequent and/or recurring infections, bruises and cuts that take a long time to heal, a sensations of tingling or numbness in the distal parts of the body, and trouble getting or maintaining an erection (CDA, 2006c). Trouble getting or maintaining an erection was not recognized as a symptoms of diabetes by 131 (75%) of participants. A sensation of tingling or numbness in hands or feet and changes in weight were also not greatly recognized as symptoms, as 69 (39%) and 63 (36%), respectively, did not check off boxes indicating them as symptoms.

Complications of diabetes include heart disease, kidney disease, eye disease, problems with erection and nerve damage (CDA, 2006c). Two of five major categories of complications were recognized by over 70% of the participants. Of the participants, 60 (34%) recognized impotence, 114 (65%) recognized heart disease, and 75 (43%) recognized nerve damage as complications.

Table 5

Frequencies Related to Risk Factors, Signs and Symptoms, and Complications

Risk Factors of Diabetes		
	Yes	No
Being overweight	155 (89%)	20 (11%)
Increasing age	53 (30%)	122 (70%)
Not exercising	136 (78%)	39 (22%)
Having a parent, brother or sister with diabetes	122 (70%)	53 (30%)
Being First Nations	43 (25%)	132 (75%)
Eating Sweets	127 (73%)	48 (27%)
Signs and Symptoms of Diabetes		
	Yes	No
Unusual (increased) thirst	139 (79%)	36 (21%)
Frequent need to urinate	126 (72%)	49 (28%)
Changes in weight (increase or decrease)	112 (64%)	63 (36%)
Extreme tiredness or lack of energy	143 (82%)	32 (18%)
Blurred vision	144 (82%)	31 (18%)
Bruises and cuts that take a long time to heal	123 (70%)	52 (30%)
A sensation of tingling or numbness in hands or feet	106 (61%)	69 (39%)
Trouble getting or maintaining an erection	44 (25%)	131 (75%)
Complications of Diabetes		
	Yes	No
Kidney disease	132 (75%)	43 (25%)
Eye disease	126 (72%)	49 (28%)
Impotence (problems with erection)	60 (34%)	115 (66%)
Heart disease	114 (65%)	61 (35%)
Nerve damage	75 (43%)	100 (57%)

N = 175

Casual Plasma Glucose Testing

One hundred and thirty-nine individuals had casual glucose testing performed. Of these individuals, 18 (13%) had readings considered to be impaired glucose tolerance (7.8-11.0 mmol). Two (1.4%) people had readings greater than 11.0 mmol. Thirteen (9%) had readings between 7.0 and 7.8 mmol.

Tests of Difference

Gender. Females appeared to be more versed in the signs and symptoms of diabetes as well as recognizing family history as a risk factor for diabetes. Females were significantly more likely than males to recognize the signs and symptoms of increased thirst (85% vs. 71%, $X^2[1, N = 162] = 4.448, p = .035$); blurred vision (87% vs. 74%, $X^2[1, N = 162] = 4.194, p = .041$); and a sensation of tingling or numbness in hands or feet (68% vs. 51%, $X^2[1, N = 162] = 4.886, p = .027$). Females were also significantly more likely to recognize that family history of diabetes is a risk factor for developing diabetes (78% vs. 60%, $X^2[1, N = 162] = 6.364, p = .012$).

Age. An ANOVA showed that the effect of age was significant for those who believe that diabetes can cause complications $F(6, 164) = 2.839, p = .012$ or that if you have diabetes, you can no longer eat sweets $F(6, 165) = 2.148, p = .05$. ANOVA also showed the belief that if someone in your family has diabetes, you will get diabetes for sure $F(6, 166), = 2.354, p = .03$.

Education level. The level of education of the study participants appeared to have a significant impact on knowledge, attitudes and beliefs of Type 2 diabetes. Education level was significant in knowledge of the definition of Type 2 diabetes $F(3, 153) = 4.028$, $p = .009$. Those with a primary level education had a significantly lower understanding of the definition of diabetes ($M = 1.62$, $SD = .590$) than those with a university level education ($M = .95$, $SD = .669$). Participants with a primary level education were more likely to believe that you could no longer eat sweets if you have diabetes ($M = 1.45$, $SD = 1.057$) than those with a university level education ($M = 2.46$, $SD = 1.021$), $F(3, 163) = 4.485, p = .005$. College participants were less likely to believe that there is a cure for

diabetes ($M = 2.65$, $SD = .839$) than those with a primary level education ($M = 1.82$, $SD = 1.006$), $F(3, 164) = 3.255$, $p = .023$. College participants were significantly more likely to agree that diabetes can cause complications in other organs in your body ($M = .58$, $SD = .620$) than those educated at the secondary level ($M = 1.03$, $SD = .775$), $F(3, 162) = 3.961$, $p = .009$. Many of the primary-educated participants were not sure if they would be afraid to be tested for diabetes ($M = 2.27$, $SD = 1.352$), whereas the college participants tended to disagree that they would be afraid ($M = 3.10$, $SD = .831$), $F(3, 164) = 3.170$, $p = 0.26$. Finally, as the level of education increased from primary ($M = 1.41$, $SD = .854$), to secondary ($M = 2.04$, $SD = .953$), to college ($M = 2.16$, $SD = .820$) and university ($M = 2.58$, $SD = .929$), the participants tended to disagree more that if you have a family history of diabetes, you will get diabetes for sure $F(3, 164) = 6.470$, $p = < .001$.

Language. An ANOVA showed that the effect of language on fear of getting screened for diabetes because of not wanting others to know you have diabetes was significant, $F(2, 172) = 3.252$, $p = .041$. Those whose primary language in the home is English were more likely to disagree that they would be afraid to get screened ($M = 3.02$, $SD = .930$) than those participants whose main language in the home is Ojibway ($M = 2.46$, $SD = 1.216$). Also, those whose main language is English ($M = 2.67$, $SD = .877$) or English and Ojibway ($M = 2.24$, $SD = 1.047$) were more likely to disagree that there is a cure for diabetes, in comparison to those whose main language is Ojibway ($M = 2.24$, $SD = 1.047$). Again, this may have been due to a changing culture. In many communities, the older members of the community continue to speak their native tongue, whereas the younger generation have grown up speaking mainly English. Furthermore,

the younger generation has been exposed to Western culture for a much greater portion of their lives. Therefore, they may not be as ashamed to have a disease that was not consistent with their original way of life.

Employment. Those who were employed had a significantly greater knowledge of several variables relating to risks, signs and symptoms, and complications of diabetes when compared to those who are currently unemployed with chi-square tests. There were no variables in which the unemployed had a higher knowledge base. Table 6 provides the relevant statistics. Those who were employed had a better understanding than those who were unemployed (37% vs. 21%, $\chi^2[1, N = 171] = 4.517, p = .034$). When assessed with *t* tests for mean difference, those who were unemployed were less likely to agree with the simplified definition of diabetes, that diabetes can cause complications, that diabetes can be prevented and that the number of cases of Type 2 diabetes is increasing. See Table 7 for the relevant statistics. Finally, those who were employed ($M = 2.93, SD = 1.042$) were more likely to disagree that they would be afraid to get screened for diabetes because they would not want others to know if they had diabetes than those who were unemployed ($M = 2.53, SD = 1.073$), $t(169) = 2.452, p = .015$.

Table 6

Employment Status: Chi-Square Tests

Variable	$\chi^2(1, N = 171)$	Significance (p)	% of employed responding "yes" (correct answer)	% of unemployed responding "yes" (correct answer)
Risk factor is being overweight	10.870	.001**	95%	78%
Risk factor is not exercising	11.215	.001**	86%	64%
Risk factor is having a family history	3.731	.05*	75%	61%
Sign and symptom is increased thirst	11.175	.001**	88%	67%
Sign and symptom is changes in weight	4.586	.032*	70%	54%
Sign and symptoms is extreme tiredness or lack of energy	4.595	.032*	87%	74%
Sign and symptom is blurred vision	3.724	.05*	87%	75%
Complication is kidney disease	6.048	.014**	82%	66%
Complication is eye disease	5.701	.017*	78%	61%
Complication is heart disease	8.593	.003**	73%	51%

* Significance at $p \leq .05$
**Significance at $p \leq .01$

Table 7

Employment Status: T Tests

Variable	*T* test	Degrees of freedom	Significance (p)	*M* and *SD* of employed	*M* and *SD* of unemployed
Definition of Type 2 diabetes	-2.413	159	.017*	*M* = 1.20 *SD* = .802	*M* = 1.46 *SD* = .608
Diabetes can cause complications	-2.584	154	.011**	*M* = .75 *SD* = .719	*M* = 1.03 *SD* = .680
Diabetes can be prevented	-2.148	169	.015*	*M* = .84 *SD* = .838	*M* = 1.16 *SD* = .940
The number of people who have diabetes is increasing	-4.021	133	< .001**	*M* = .72 *SD* = .650	M = 1.17 *SD* = .761

* Significance at $p \leq .05$
**Significance at $p \leq .01$

Marital status. ANOVA was conducted to determine if there was any difference in means for those single, common-law, married, widowed, divorced, or separated. No

significant differences were found between these groups and the various variables. It should also be noted that there was a low response rate to the question pertaining to martial status.

Family history. The participants with a family history of diabetes were more likely to believe that they were at risk of developing diabetes in the next 10 years ($M = 1.35$, $SD = .851$) than did those participants who do not have a family history of diabetes ($M = 2.05$, $SD = .899$), $t(134) = -4.273$, $p = < .001$. Family history of diabetes would include relatives to the participant (i.e., grandparents, parents, siblings, and children).

Those with a family history of diabetes, versus those without, had a significantly greater knowledge of several variables relating to risks, signs and symptoms, and complications of diabetes when compared to each other with chi-square tests. There were no variables in which the group without a family history of diabetes had a higher knowledge base. Table 8 provides the relevant statistics.

The reader should note that those with a family history of diabetes or those without a family history of diabetes did not have an understanding that being First Nations (Aboriginal) is a risk factor for developing diabetes; however, those with a family history of diabetes had a more significant understanding than those who did not (33% vs. 5%, $\chi^2[1, N = 140] = 11.420$, $p = .001$). The same occurred for recognizing that trouble getting or maintaining an erection is a symptom of diabetes. Those with a family history of diabetes were more likely to recognize the above as a symptom than those who without a family history; however, the overall knowledge of symptoms was very low (33% vs. 11%, $\chi^2[1, N = 140] = 7.282$, $p = .007$). The researcher was unable to find

statistics in the literature pertaining to individuals recognizing trouble getting or maintaining an erection as a sign of diabetes.

Screened in the past for diabetes. The participants with a family history of diabetes were more likely to have been screened in the past for diabetes, in comparison to those with no family history (80% vs. 62%, $\chi^2[1, N = 143] = 5.387, p = .020$). Those who had been screened in the past for diabetes were also more likely to believe that diabetes can be prevented ($M = .71$, $SD = .810$) than those who had not been screened ($M = 1.21$, $SD = .901$), $t(141) = -3.464, p = .001$. Those who had been screened were also more aware that the number of people with diabetes is increasing ($M = .70$, $SD = .704$) than those that have not been screened ($M = .95$, $SD = .692$), $t(141) = -2.090, p = .038$.

Table 8

Family History

Variable	$\chi^2(1, N = 140)$	Significance (p)	% of participants with a family history responding "yes" to variable (correct answer)	% of participants with no family history responding "yes" to variable (correct answer)
Risk factor is being overweight	4.110	.043*	93%	82%
Risk factor is not exercising	5.063	.024*	85%	68%
Risk factor is having a family history	6.149	.013**	75%	53%
Sign and symptom is increased thirst	8.260	.004**	85%	63%
Sign and symptoms is extreme tiredness or lack of energy	3.714	.05*	87%	74%
Sign and symptom is bruises and cuts that take a long time to heal	5.913	.015*	70%	47%
Complication is eye disease	4.565	.033*	78%	61%
Complication is heart disease	9.413	.002**	73%	45%

* Significance at $p \leq .05$
**Significance at $p \leq .01$

Participants who had been screened in the past, versus those who had not, had a greater knowledge of some variables relating to risks and signs and symptoms of diabetes when compared to each other with chi-square tests. There were no variables in which the group not previously screened for diabetes had a higher knowledge base. Table 9 provides the relevant statistics.

Table 9

Past Screening for Diabetes

Variable	$X^2(1, N = 143)$	Significance (p)	% of participants screened in the past responding "yes" (correct answer)	% of participants not screened in the past responding "yes" (correct answer)
Risk factor is being overweight	6.452	.011**	95%	83%
Risk factor is not exercising	5.225	.022*	87%	72%
Sign and symptom is increased thirst	9.989	.002**	88%	67%
Sign and symptoms is frequent need to urinate	11.487	.001**	86%	61%

* Significance at $p \leq .05$
**Significance at $p \leq .01$

Tests of Relationships

A significant correlation existed between those who were afraid to get screened for diabetes and those who felt that having diabetes is shameful $r(172) = .487, p = .01$, indicating that those who were afraid to get screened for diabetes also felt that having diabetes was shameful. Significant correlations also existed among those who believed that eating traditional foods prevents diabetes and those who believed that First Nations people get diabetes if they eat junk food $r(172) = .165, p = .05$; the participants who believed that having diabetes mean no longer eating sweets and having diabetes means no longer eating foods that you want to $r(171) = .381, p = .01$; the participants who agreed with the definition of Type 2 diabetes that was provided and those who knew that the

incidence of diabetes is increasing $r(162) = .265, p = .01$; and finally a correlation was found between those who believe that being overweight causes Type 2 diabetes and not exercising causes Type 2 diabetes $r(173) = .344, p = .01$. In all of the previous cases, as the belief in the first variable increased, so did the belief in the second variable.

CHAPTER 6: DISCUSSION

The findings indicated that the knowledge of Type 2 diabetes among the participants varied. There is a paucity of research discussing the increase of the incidence of diabetes. For example, Fox, Harris, and Whalen-Brough (1994) noted that "the Sioux Lookout Zone of NWO has seen an increase of diabetes by 45% over a 10 year period" (as cited in Young et al., 2000, p. 4). In their study regarding awareness and knowledge of diabetes, Mohan et al. (2005) found only 60.2% of the participants were aware that prevalence of diabetes is increasing. Of the study participants in Whitefish Bay, 80% felt that the incidence of diabetes is increasing.

Within the questionnaire that the participants completed, they were asked to state whether they believed that various variables are risk factors for diabetes. All of the variables that were given are, indeed, known risk factors for the development of Type 2 diabetes. The respondents are well versed in many of the risk factors, such as being overweight, not exercising, having a family history of diabetes, and eating sweets. Satterfield et al. (2003) found similar findings in their study in which the participants took part in focus groups and identified the "lack of physical activity, poor eating habits and obesity, family history of diabetes, American lifestyle (e.g., fast paced, convenience based), and stress" as risk factors (p. S59). Mohan et al. (2005) had very different findings in their study, with the participants having very little recognition of the risk factors. What was very interesting in this current study was the participants' lack of agreement that increasing age and being of First Nations ancestry are risk factors. Health Canada (2000) stated statistics of diabetes ranging from "3-5 times that of the general population for Aboriginals" (p. 10). One possibility why increasing age was not

considered a risk factor could be due to the cultural respect for Elders within the community. Elders are very respected and knowledgeable within the community, so if there is a feeling of shame associated with diabetes you would not want to shame the Elder.

On five of the questionnaires in which being of First Nations ancestry was not indicated as a risk factor, comments were written beside this variable, stating such things as "First Nations are not at any greater risk than anyone else" and "no more than anyone else." A lack of consensus that being First Nations is a risk factor could be due to the feelings about the origin of diabetes. As mentioned previously, there is a clear theme in the literature that Aboriginals believe diabetes to be a "white man's sickness/illness" (Garro, 1995; PHAC, 1997; Young et al., 2000). Therefore, the participants may have viewed that being First Nations is not a risk factor in itself but straying from traditional ways of First Nations and living a more Western lifestyle may be a risk factor.

It is clear in the literature that diabetes is believed to be caused because of a movement away from traditional lifestyles (hunting and gathering) to Western lifestyles (prepared foods; Bruyere & Garro, 2000; Garro, 1995; PHAC, 1997; Young et al., 2000). Garro completed a qualitative study reviewing the explanation of diabetes in an Anishinaabe community, and the results demonstrated that a general belief was held that moving away form a traditional diet of wild foods and moving into a Western diet was the main cause of the increased incidence of diabetes. The following two quotes from Garro's study demonstrate this point. "You get 'sugar' (diabetes) eating too many sweets – sugar, candy bars, sodas – things like that" and "They never ate the foods we're eating now. They used to eat wild life. Nowadays, nobody eats wild food" (p. 41). Bruyere and

Garro had similar findings, with 19 of 22 participants associating the lack of wild foods with the increasing rates of diabetes in the community. Whitefish Bay residents had similar feelings, with 75% feeling that eating too much sugar causes diabetes and 28% believing that First Nations people would not get diabetes if they ate traditional foods.

Within the literature, researchers described a feeling of shame brought forth by Aboriginals upon a diagnosis of diabetes. Boston et al. (1997) examined the meanings that Canadian Aboriginals attribute to the rising incidence of diabetes and found that diabetes tends to marginalize individuals within the community. The following quote from Boston et al.'s research conveyed the sense of shame: "They'll talk about it in my community, they'll talk about it as a subject....but as an individual you keep it hidden" (p. 6). Griffin et al. (2000) found similar findings in their study, which examined barriers to Native Americans participating in a diabetes project. "Mentors commented that sometimes people were ashamed of having diabetes and did not want people to see them in sessions" (p. 684).

Interestingly, the data collected from Whitefish Bay residents suggested that if the primary language in the home is English, the individual statistically is less likely to be afraid to get screened for diabetes in fear that others would know than those who mainly spoke Ojibway in the home. This trend is in line with the feeling that although having diabetes is shameful, only 13% of those surveyed felt that it is shameful to have diabetes. This represents a small proportion of the population feeling shame toward a diabetic diagnosis. However, this has implications for health promotion. If an individual feels shame toward a diabetic diagnosis, he/she may be less likely to seek health care and could suffer greater complications and have a decreased quality of life.

Only 25% of the participants recognized trouble getting or maintaining an erection as a sign of diabetes, and only 34% recognized impotence as a complication. Three fifths of the participants were female and may not have recognized these as factors. This could be an area for education. Considering that heart disease is a leading cause of death in Canada (Statistics Canada, 2005b) and that 80% of people with diabetes will die as a result of heart disease (CDA, 2006d), it was surprising that only 65% recognized heart disease as a complication and only 43% recognized nerve damage as a complication. In general, the long-term complications of diabetes were not well known, with a range of 34% to 75% of the participants recognizing individual body systems commonly affected. Similar findings of low knowledge of complications have been found in other studies, such as Simmons and Voyle's (2003) study on reaching hard-to-reach populations for diabetes prevention programs. They found that 65% of those surveyed had no knowledge of complications and that 68% had no knowledge of the symptoms. Mohan et al. (2005) found only 5.8% knew that heart attacks are a possible complication, and 2.2% knew that a stroke is a possible complication of diabetes.

An interesting finding was the knowledge differences among various subgroups of the population. Increased knowledge for various subgroups was noted for variables such as risk factors, signs and symptoms, and complications. Females were more versed in diabetes knowledge than males, as were those who had a higher level of education, those who were employed, those with a family history of diabetes, and those who had been screened in the past for diabetes. This has significant implications for diabetes prevention programs and demonstrates target groups such as males, those less educated,

the unemployed, individuals with no family history, and those who have never been screened in the past.

The findings also demonstrated that family members likely discuss their diabetes history with family members and, hence, educate them at the same time. This may be due to a comfort level within the family to discuss factors affecting individual health or a desire to prevent diabetes among other family members. Culturally appropriate diabetes educational materials could be developed specifically for family members of diabetics. Those who were screened in the past have likely been educated by the community health representative or the registered nurse performing the glucose scan. These are prime opportunities for education that appear addressed by staff. Furthermore, the school system would benefit from diabetes education because those with less education knew less about diabetes.

Applicability of the Health Belief Model

The HBM has been used to develop messages that are likely to persuade individuals to make healthy decisions (Mississippi State University, 2001). It helps to explain certain health-related behaviours, guide the search as to why these behaviours occur, and identify possible areas of change. Key elements of the model are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action (some also include self-efficacy).

Many participants (46%) felt that they are at risk of getting diabetes in the next 10 years. Also, those respondents with a family history of diabetes were more likely to have been screened for diabetes than those with no family history. This indicates that the participants did have a perceived susceptibility (first element of HBM) of diabetes. In

addition, 73% of those surveyed were aware that they have a family history of diabetes, which places them at a higher risk.

Although the participants had a general awareness of diabetes, there was variability of understanding pertaining to the severity of the disease, as demonstrated by a lack of knowledge of some of the serious complications that can occur with diabetes; therefore, individuals would have a lower perceived severity (second element of HBM). The most recognized complications were kidney and eye disease. However, impotence, nerve damage, and heart disease were not well recognized. Although people may have a general understanding of diabetes, they may be lacking insight as to the severity of potential complications that could decrease quality of life and quantity of years of life. .

The third element of the HBM, namely, perceived benefits, was clearly displayed, with the majority (76%) feeling that diabetes could be prevented and that prevention programs could have a positive impact on lowering the incidence by changing modifiable risk factors such as weight and diet.

As discussed earlier, previous studies have discussed the fact that many First Nations people find diabetes to be shameful. In this study, 13% found it shameful to have diabetes, and 18% would not want to be screened because they would not want others to know. Not surprisingly, those who did find having diabetes shameful would also be afraid to get screened for diabetes because they would not want others to know, representing the forth element of the HBM, that is, perceived barriers. Negative social associations such as this could be addressed with educational programs.

The participants in this study already embarked on the fifth element of the HBM, cue to action, by completing the questionnaire. They were eager to complete the survey

when told by the researcher that one of the goals of the study was for the health centre to be able to utilize the information gained to create a prevention program for the community. This showed a general interest of wanting to prevent diabetes among other community members in the future and a desire for improved health. This also demonstrated recognition of the need to prevent diabetes to improve quality of life.

Screening

As of May 2006, Whitefish Bay had 67 known cases of Type 2 diabetes. This gives a prevalence rate of 11%. This is comparable to the findings derived from Young et al.'s (2000) study. Young et al. discussed the crude prevalence results of the First Nations and Inuit Regional Health Survey (FNIRHS), demonstrating that 8% of males and 13% of females have diabetes. This survey covered First Nations people living on reserves in all provinces (except Newfoundland) as well as the Inuit of Labrador. Other studies have found prevalence in epidemic proportions. "The Oji-Cree population of the Sandy Lake region of Ontario has the third highest prevalence of type 2 diabetes in the world" (Carpentier et al., 2003, p. 1485). Reported age-standardized prevalence rates of diabetes in Sandy Lake First Nation is 280/1000 and 242/1000 for women and men; comparable numbers also have been noted in other communities. Green et al. (2003) studied the epidemiology of diabetes among registered First Nations in Manitoba and found an incidence of 248/1000 and 209/1000 for women and men, respectively, from data collected from the population-based Manitoba Diabetes Database. Green et al.'s findings suggested "rates of diabetes up to 4.5 times higher than those found in the non-First Nation population" (p. 1993) in the Manitoba First Nations population.

Eighteen (13%) of those screened had a reading that is consistent with impaired glucose tolerance, as outlined by the CDA (2003) as 7.8 mmol or greater. In "Algonquin reserves in northeastern Quebec and among the Oji-Cree of Sandy Lake, in NWO, the prevalence rates of oral glucose intolerance reached as high as 25% among all adults" (Young et al., 2000, p. 3). The Naotkamegwanning Health Services sends anyone with a casual screen of 7.0 or greater for further testing due to their high rates of diabetes. In the samples collected in May 2006, 13 (9%) had casual rates of 7.0 to 7.8 mmol. Therefore, in total, 31 (22%) of those screened were going to be further tested. Those with a high casual rate are also sent for counseling with the local diabetes health educator to initiate education on lifestyle modifications to prevent the development of Type 2 diabetes. This is of relevance. Unwin, Shaw, Zimmet, and Alberti (2002) reported that in their study on impaired glucose tolerance, "in most populations, 60% of people who have developed diabetes have either impaired glucose tolerance or impaired fasting glucose 5 years or so before" (p. 709).

Limitations

Although this study revealed some important information regarding the knowledge, attitudes, and beliefs of Whitefish Bay residents regarding Type 2 diabetes, there were some limitations to the study. The questionnaire was only available in English, so those who could not read English were not able to participate in the study. However, this was a small proportion of the community (approximately 10 people). For two of the questionnaires that were filled out, the community health representative provided translation. However, 5 other potential participants who would have liked to have participated were unable to because of the language barrier.

The questionnaire was developed in such a way that there were no open-ended questions. This was necessary to make the study feasible; however, having close-ended questions would have allowed the participants to guess answers, thus changing the perceived level of knowledge.

Finally, the study did not distinguish between those who have already been diagnosed with diabetes and those who do not have diabetes. It would have been interesting to compare the level of the knowledge between the two groups. However, the sample size for those with diabetes may have been small. Further, because of some feeling a sense of shame attached to a diabetic diagnosis, the participants may not have wanted to disclose such information.

Recommendations

The following recommendations are suggested for the community of Whitefish Bay to work on accomplishing. It should be noted that the recommendations will need to take place at various levels and sectors in order to achieve such goals.

Policy

- To increase skills of professionals, leading to more culturally appropriate care and prevention rather than acute care. This could include strategies in the undergraduate, postgraduate, and continuing education curricula. Increased knowledge of health care professionals could lead to a snowball effect of education for the community as a whole through professional bodies, coalitions, working groups, and general peer interaction.
- To increase funding to provide an incentive for health care professionals to take preventative measures. Currently, the fee-for-service model does not allow for

adequate remuneration for preventative health care. Increasing incentives will likely increase preventative measures and education.

Practice Particular to Whitefish Bay

- To develop culturally appropriate educational materials (e.g., pamphlets, posters, and videos) that discuss what diabetes is, risk factors, signs and symptoms, and complications. This would increase awareness, leading to increased prevention and early detection.
- To target the populations at greater risk (i.e., males and unemployed, as determined by the findings) with health promotion campaigns to prevent diabetes and increase diabetes awareness.
- To develop an educational program on the importance of healthy lifestyles as well as screening and prevention of diabetes to be delivered on a regular basis to primary school children, with hopes of increasing their knowledge base.
- To develop communitywide events as a vehicle (nutrition bingos, events at the annual Treaty Day, and diabetes friendly feasts) to increase knowledge of healthy lifestyles and diabetes prevention.
- To develop partnerships with the local food store to offer fresh fruits and vegetables as well as other healthy food choices.
- To implement a collaborative approach through partnerships with the local health centre; the district health unit; and physicians, nurses, and other health care providers to provide culturally sensitive primary, secondary, and tertiary diabetes prevention.

- To continue to screen residents for Type 2 diabetes and educate those with impaired glucose tolerance or IFG on the importance of lifestyle modifications.
- To develop guidelines at the health centre to determine when education and screening should be incorporated into appointments, for example, make diabetes prevention education a part of every well women visit.

Future Implications for Research

- To conduct further research on barriers to Whitefish Bay residents to accessing healthy foods and exercising in order to develop solutions to minimize these barriers.
- To conduct further research on the knowledge, attitudes, and beliefs of individuals regarding diabetes in other population areas.
- To conduct further research to determine differences in knowledge, attitudes, and beliefs between diabetics and nondiabetics in order to develop appropriate educational materials.

Conclusion

This study was designed to assess the knowledge, attitudes, and beliefs of Whitefish Bay residents regarding Type 2 diabetes. The objectives were to examine current literature related to Type 2 diabetes, with an emphasis on the Aboriginal population; distribute a questionnaire; assess knowledge, attitudes, and beliefs; assess Whitefish Bay residents for the risk of Type 2 diabetes; and make recommendations regarding prevention of Type 2 diabetes for Whitefish Bay residents. The HBM was the basis for the theoretical framework because it helps to explain certain health-related behaviours, guide the search as to why these behaviours occur, and identify possible

areas of change. The questionnaire that was developed assessed where knowledge deficits occurred in order to determine where to place educational efforts.

Data were collected from a cohort of 175 Whitefish Bay residents over the age of 18. This sample size reflected approximately 55% of the total eligible population. The results of the study indicated that the knowledge of Type 2 diabetes among the participants was quite poor in some areas and above expected in others. Fifty-five (55%) had knowledge of a general definition of Type 2 diabetes. Areas of potential education were noted in the identification or risk factors, signs and symptoms, and complications of diabetes. Specific target groups at higher risk due to a lower level of knowledge were also presented. Prevalence rates of diabetes was recorded as 11% and 13% of those screened by Naotkamegwanning Health Services had impaired glucose tolerance. Many recommendations were made to increase the knowledge of Whitefish Bay residents and subsequently contribute to primary, secondary, and tertiary prevention.

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APPENDIX A: COMMUNITY RESOURCES

Please note that the community resources located within Whitefish Bay are extremely limited. Most services require travel to Kenora, so the addresses of the organizations base offices are listed.

Agency/Organization	Overview	Contact
Canadian Diabetes Association	• Charitable organization • Diabetes research, education and advocacy	Based out of Thunder Bay: Contact: Sherry Kudlacek #501-200 S. Syndicate Ave. Thunder Bay, ON P7E 1C9 807-577-4232
Comcare Health Services	• In home nursing services • Personal and home support services • Therapy and rehabilitation services • Speciality services including diabetes care	Based out of Kenora: B01-820 Lakeview Drive, Kenora, ON P9N 3P7 807-467-8424
Community Care Access Centre for Kenora and Rainy River Districts	• Planning, management and delivery of community based health services • Nursing, PT, OT, nutrition, SLP, social work • Personal support/homemaking • Case management	Based out of Kenora: 21 Wolsley Street Kenora, ON P9N 2S7 807-467-4757
Diabetes Health Network (Northern)	• funded by the Ontario Ministry of Health and Long-Term Care • A range of diabetes specialty programs to meet the needs of people in communities of northern Ontario • Specialized programs focusing on children and young people in selected communities across the province.	Based out of Thunder Bay 1204A Roland Street Thunder Bay, ON P7B 5M4
Health and Welfare Canada – Health and Services Branch	• Health programs for area reserves • Financial assistance for prescriptions, transportation or accommodations • Immunizations and STD clinics on reserves	Based out of Kenora: 100 Park Street Kenora, ON P9N 1B2 807-468-8961
Interpreter Access Service	• 24 hour emergency service • Services provided for various cultural groups including Aboriginals	Based out of Kenora: Contact: Val Ross Multicultural Association of Kenora and District

	• Interpreters work with health care professionals, lawyers, etc.	207 1st Street South Kenora, ON P9N 1C2 807-468-7140
Kenora Anishinaabe Kweg	• Community kitchen • Support services • Aboriginal Healing and Wellness Strategy	Based out of Kenora: 208 Water Street Kenora, ON P9N 1S4 807-468-3337
Native Healing Program: Lake of the Wood Hospital	• Spiritual healing through traditional medicine, sweats and prayers • Provide native community support • Liason between hospital and community • Hostel for out of town visitors	Based out of Kenora: Contact: Madeline Skead Lake of the Woods District Hosptial 21 Sylvan Street Kenora, ON 807-468-9861
Northwestern Health Unit	• Various public health programs geared towards health promotion and disease prevention (some strategies geared towards diabetes prevention include nutrition, health weights and physical activity)	Based out of Kenora: Contact: Dorthy Strain 21 Wolsley Street Kenora, ON P9N 3P7 807-468-3147
Telehealth Ontario	• Free access to a registered nurse 24/7 via telephone • Receive general health information and health advice	Toll free number: 1-866-797-0000
Victorian Order of Nurses	Services offered for Kenora and surrounding areas include speciality services such as: • flu clinics • wellness clinics • specimen collection	Based out of Thunder Bay area: Contact: Donna Opie, Program Manager 200-214 Red River Rd. Thunder Bay, ON P7B 1A6
Whitefish Bay Health Centre	• Provide primary health care to the residents of Whitefish Bay • MD and NP 1 day/week • Health promotion and disease prevention	Based out of Whitefish Bay Contact: Pat Copenace

APPENDIX B: QUESTIONNAIRE

Part I: Demographics

1. **What is your gender?**

   ☐ Male ☐ Female

2. **How old are you?**

   ☐ 18-30 years ☐ 61—70 years

   ☐ 31-40 years ☐ 71-80 years

   ☐ 41-50 years ☐ 81 years and older

   ☐ 51-60 years

3. **What is your highest level of education?**

   Primary (grades 1 to 8) Please specify which grade:_____

   Secondary (grades 9-13) Please specify which grade: _____

   Community College. Please specify years or diploma: _____

   University. Please specify years or degree: _____

   Graduate School. Please specify years or degree: _____

   Other: Please specify: _____

4. **What language is most often spoken in your home?**

   ☐ English

   ☐ French

   ☐ Ojibway

   ☐ Other (specify): _____

5. **Are you currently employed?**

   ☐ Yes ☐ No

6. What is your main source of income?

☐ Employment (yours and/or your partner's)☐ Employment Insurance

☐ Social Assistance/Ontario Works ☐ Parents or Family

☐ Disability Pension ☐ Other: _____

☐ Parental Leave

7. What is your annual household income before taxes?

☐ Less than $14,999/year

☐ $15,000-$24,999/year

☐ $25,000-$29,999/year

☐ $30,000-$39,999/year

☐ $40,000-$49,999/year

☐ $50,000-$59,999/year

☐ $60,000-$69,999/year

☐ $70,000-$79,999/year

☐ More than $80,000/year

8. What is your marital status?

☐ Married ☐ Separated

☐ Living Common-Law ☐ Divorced

☐ Widowed ☐ Single

9. Do you have children

☐ Yes ☐ No

10. I have a family history diabetes (Check all that apply)

☐ Yes ☐ No

11. Have you ever been screened for diabetes in the past?

☐ Yes ☐ No

Part II: Knowledge, Attitudes and Beliefs

1. Type 2 diabetes is when you do not produce enough insulin or when the body does not use the insulin that the body makes very well

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

2. You will always have signs and symptoms if you have diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

3. Diabetes can cause complications in other organs in your body

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

4. Eating too much sugar can cause diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

5. Not exercising can cause diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

6. Being overweight can cause diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

7. Diabetes can be prevented

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

8. There is a cure for diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

9. It is shameful to have diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

10. I am afraid to get screened for diabetes because I would not want others to know I have diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

11. The number of people who have diabetes is increasing

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

12. Having diabetes means you can no longer eat sweets

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

13. Having diabetes makes it hard to take part in traditional events and celebrations

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

14. If you follow a traditional lifestyle you will not get diabetes

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

15. First Nations people get diabetes if they live a more western lifestyle

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

16. Having diabetes means you can no longer eat the foods you want to

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

17. If you have diabetes you can no longer do things that you enjoy doing

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

18. If someone if your family has diabetes you will get it for sure

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

19. I think that I am at risk for getting diabetes in the next 1-10 years

☐ Strongly Agree ☐ Agree ☐ Not Sure ☐ Disagree ☐ Strongly Disagree

20. From the list below, check the boxes that you think are risk factors for diabetes (Check all boxes that apply):

☐ Being overweight

☐ Increasing age

☐ Not exercising

☐ Having a parent, brother or sister with diabetes

☐ Being First Nations

☐ Eating sweets

21. From the list below, check the boxes that you think are signs and symptoms for diabetes (Check all boxes that apply):

☐ Unusual (increased) thirst

☐ Frequent need to urinate

☐ Changes in weight (increase or decrease)

☐ Extreme tiredness of lack of energy

☐ Blurred vision

☐ Bruises and cuts that take a long time to heal

☐ A sensation of tingling or numbness in hands or feet

☐ Trouble getting or maintaining an erection

22. Having diabetes can cause (Check all boxes that apply):

☐ Kidney disease ☐ Heart disease

☐ Eye disease ☐ Nerve damage

☐ Impotence (problems with erection)

APPENDIX C: COVER LETTER

Ella Wiebe

Lakehead University

Master of Public Health Program

955 Oliver Rd.,

Thunder Bay, ON

P7B 5E1

(807) 983-3247

Ella.Wiebe@normed.ca

Dear Potential Participant:

I am requesting your participation in a study titled, "Knowledge, Attitudes, and Beliefs of Whitefish Bay Residents Regarding type 2 diabetes." The researcher has received an award to conduct this research from the Heart and Stroke Foundation of Canada.

The overall purpose of this is study is to examine the knowledge, attitudes, and beliefs of Whitefish Bay residents (18 years of age and over) regarding type 2 diabetes.

The objectives of the study are:

- To examine the current literature related to type 2 diabetes with an emphasis on the knowledge, attitudes and beliefs of type 2 diabetes in Aboriginals populations.
- To develop a questionnaire to assess Whitefish Bay residents' knowledge, attitudes, and beliefs of type 2 diabetes.

- To assess the potential for diabetes of blood samples collected by Whitefish Bay Community Health Centre from residents over the age of 18.
- To make recommendations regarding prevention of type 2 diabetes for Whitefish Bay residents

The research study hopes to reveal the meaning and general knowledge of type 2 diabetes in Whitefish Bay. Currently, over 2 million people are living with diabetes in Canada. Further, Aboriginals are at an increased risk of 3-5 times that of the general population. The information gained from this study will be utilized to understand factors relating to type 2 diabetes in Whitefish Bay in order to develop a culturally appropriate prevention program.

You will be requested to participate in a confidential written questionnaire that will take approximately 30 minutes to complete. Questions will be centered on your knowledge, attitudes, and beliefs of type 2 diabetes. General questions regarding demographic information such as your age, education level, martial status etc. will also be asked.

Your participation in this study is voluntary and you may withdraw form the study at any time and/or refuse to participate in any part of the study (i.e. choose not to answer certain questions for personal reasons).

All information you provide will remain confidential and securely stored at Lakehead University in a locked cupboard and stored for 7 years and then shredded. Further, the questionnaires will not be labelled to identify who completed them.

Findings of the study may be published, however, you will remain anonymous. A copy of the final report will be available to you at your request to the researcher (Ella Wiebe) upon completion of the project.

Thank you in advance for your willingness to participate in this study. If you have any questions, please contact Ella Wiebe at (807) 983-3247 or email Ella.Wiebe@normed.ca or Dr. Darlene Steven, Professor at Lakehead University at (807) 343-8643.

Sincerely,

Ella Wiebe, BScN, RN, MPH (Cand.)

APPENDIX D: CONSENT FORM

The research is being conducted by:

Ella Wiebe

Lakehead University

Master of Public Health Program

955 Oliver Rd.,

Thunder Bay, ON

P7B 5E1

(807) 983-3247

Ella.Wiebe@normed.ca

My signature on this sheet indicates I agree to participate in a study by Ella Wiebe, on the knowledge, attitudes, and beliefs of Whitefish Bay residents regarding type 2 diabetes.

I also understand that:

1. I am a volunteer and can withdraw at any time during the study.
2. There is no apparent risk of physical or psychological harm.
3. The information I provide will remain confidential.
4. All data will be kept secure and only accessed by the researcher.
5. I can receive a summary of the project upon request to Ella Wiebe following the completion of the project.

I have received explanations about the nature of the study, its purpose, and procedures.

Signature of Participant: _____ Date: _____