Tuberculosis in Aboriginal Populations in Canada:

The Role of Health Care Professionals

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Abstract

The persistent presence of infectious and increasingly non-infectious diseases is a major concern among Aboriginal people of Canada. This in part can be attributed to the impact of Aboriginal peoples’ contact with the Europeans. Tuberculosis is an infectious disease which is far more common in the Aboriginal population than the Canadian born non-Aboriginal Canadians. According to Canadian authors, poverty and overcrowding in Aboriginal communities are major factors accounting for higher prevalence rates.

Children, youth and the elderly are sub groups most commonly affected. Control programs in the past such as the quarantine of infected Aboriginal people to sanatoriums left them with traumatic experiences that even up to this day contributes to the reluctance in seeking treatment. In the current efforts to combat this disease in the community, health care professionals play a crucial role.

*Keywords:* tuberculosis (TB), Aboriginal people, First Nations, Inuit, social determinants.
Tuberculosis (TB) has existed among humans for thousands of years. For example, the detection of tuberculosis from fragments of the spinal column from Egyptian mummies dates back to 2400 BCE. TB is an infectious disease caused by a bacterium *Mycobacterium tuberculosis* (M. Tuberculosis) that is spread by contact with contaminated air droplets from infected persons (New Jersey Medical School: Global Tuberculosis Institute, 2011; World Health Organization [WHO], 2011). Tuberculosis usually affects the lungs but can affect other organs such as the brain, intestines, and kidneys. Symptoms are dependent on the infected site. Pulmonary TB symptoms usually manifest as chronic cough that be associated with chest pain, haemoptysis, fatigue, weight loss, fever, and night-sweats (Zaman, 2010).

Sputum smear microscopy is widely used as the diagnostic test for TB. An estimated one third of the world’s population is infected with *M. tuberculosis*. Approximately, 8.5-9.2 million new cases and 1.2-1.5 million deaths are reported each year. The most productive ages of the world’s population are most affected by TB (WHO, 2011). Although the evidence shows a declining trend nationally, there is still a disproportionate distribution between the general non-Aboriginal population and the Aboriginal populations (Levy, 2012). Risk factors associated with the spread of TB among Aboriginal people are discussed, particularly the social determinants of health. Strategies implemented to control the spread of TB in Aboriginal populations are examined with a specific focus on the role of the health care professional (Health Canada, 2003a). A discussion of barriers that continue to exist, concludes this paper.

**Prevalence Rates**

High TB rates in Canada have been associated with Aboriginal and foreign-born populations (Phypers, Kunimoto, Behr, Scholten, & Ellis, 2007) compared to case incidence
rates of TB at 30-150 times that for the Canadian-born non-Aboriginal population (King, 2012). Studies show that in 2004 there were 21% cases of TB in Aboriginal people aged 15 years compared to only 6% for the non-Aboriginal Canadian. In Aboriginal Canadians aged 15-64 years, the rate was 71% as against 52% for non-Aboriginals. For ages 65 years and older, there were 42% versus 8% for Aboriginal versus non-Aboriginal populations respectively (Phypers et al., 2007). [Old statistic]

**Canadian national statistics.** Even though, the risk of developing active TB is very low, about 1,600 cases are identified and reported nationally each year (Health Canada, 2012). Although there has been a decline since 1924, in 2010 Statistics Canada reported 1,577 cases (new and re-treatment) with an incidence rate of 4.6 per 100,000. The Public Health Agency of Canada’s (PHAC, 2010) *Tuberculous in Canada 2009 report*, showed the highest rate of TB among Aboriginal Canadians with a rate of 27.8 per 100,000 in Aboriginal compared to 1.0 per 100,000 in non-Aboriginal people. These rates have been increasing since 2002 (PHAC, 2002; 2010).

**Provincial statistics.** Provincial trends are quite similar to national trends but case incidence among Aboriginal populations increase with remote and northern locations. For example Nunavut had a disproportionately higher incidence rate of TB in 2010. This was partly explained by a TB outbreak which reported 101 active cases with an incidence rate of 304.0 per 100,000 populations (Canadian Institute for Health Information [CIHI], 2012; Health Canada, 2012). Differences also exist in the incidence rates in other segments of vulnerable TB populations. For example, while foreign-born Canadians accounted for most cases in Ontario, British Columbia, Ontario and Quebec, in Manitoba, Saskatchewan and the North (Yukon, North West Territories and Nunavut) Aboriginal peoples were most affected. In the Atlantic Provinces cases were
distributed equally between Aboriginal people and non-Aboriginal populations. Furthermore, in Newfoundland and Labrador there were no reported cases among Aboriginal peoples (Health Canada, 2012).

**Segment of the Population Most Affected**

Tuberculosis is more common in adolescents and youth, a subgroup that under normal circumstances can overcome the disease if they were healthy (Levy, 2012). In 2010 individuals aged 25 years to 34 years were most affected accounting for 18% of the total population with an incidence rate of 6.0 per 100,000. For people 75 years and over the incidence rate was 9.6 per 100,000 (Health Canada, 2012). For cases reported for ages 25 to 44 years the provincial trends tend to follow national trends. However, Saskatchewan and British Columbia had most cases from ages 0 to 24 yrs and ages 75 and over respectively (Health Canada, 2012).

**Literature Review**

Tuberculosis among Aboriginal people has been studied extensively. Research has addressed the historical factors (pre-contact, initial contact and post contact) and the risk factors particularly the social determinants of TB. This brief review synthesizes the history of TB and risk factors including the social determinants of TB among Aboriginal people.

**Historical Context**

History has an important role in the spread of TB among Aboriginal communities and has been studied from pre-contact, initial contact and post-contact eras. Each era refers to events before, during and after European contact.

**Pre contact.** Extensive eras and prevalent health issues present in those eras influenced the health of Aboriginal people. The pre-contact era (early 1700s), was mainly characterized by parasitic infections and environmental hazards. Houston and Houston (2000) have argued that
the persistent presence of infectious and increasingly non-infectious disease among Aboriginal people can be attributed in part, to impacts of Aboriginal peoples’ contact with the Europeans.

**Initial contact.** According to Waldram et al. (2006) tuberculosis was identified from AD 100 to AD 1650 and socio-demographic changes exacerbated the outbreak of infections in the fifteen century. The expansion of trade by the Hudson Bay Company opened the sea ports and enhanced the movement of the missionaries who were already exposed to epidemics (Waldram et al., 1995). The initial Aboriginal contact with fur traders and explorers led to acute infections such as colds, influenza and smallpox (early 1700s to 1820) (Hackett, 2005). Pepperrell et al. (2012) studied the evolution of TB using historical data and genetic studies of modern TB bacteria. They found that TB lineage between Aboriginal and French communities was explained by the bacterial lineage DS6 Quebec. This bacterial linage was also present in Aboriginal populations in Saskatchewan, Ontario and Alberta. Pepperrell and colleagues (2012) attributed this to contact between these populations during the fur trade era of 1710-1870.

**Post contact.** The era between 1870s to present has been characterized by chronic infections (i.e., tuberculosis) and disease of lifestyle (i.e., obesity, diabetes, cancer etc.) (Hackett, 2005). Also reported is that First Nations and Inuit communities in the 1900s were affected by smallpox and tuberculosis and the ineffective coordination at the national level did not help address the situation (Health Canada 2003b).

**Risk Factors Associated With the Spread of TB**

The depletion of bison in the 1879 caused starvation among Aboriginal people whose health implication included a weakened immune system therefore succumbing to TB. Also, the reserve system changed the natural dwellings of Aboriginal people leading to overcrowding and unventilated housing hence serving as a catalyst for the spread of TB (Levy, 2012). Clark, Riben,
and Nowgesic (2002) attributed the high incidence of TB in Aboriginal populations to inadequate housing (i.e., high density per unit area, degree of isolation and income levels).

Many TB patients belong to socially vulnerable groups or people at higher risk of exposure to the disease. In Canada, risk factors for latent and active TB include: people who have come in contact with people known or suspected with active TB disease (i.e., family members sharing a living space), people with a history of active TB or an X-ray indicating active TB with inadequate treatment, Aboriginal communities with high rates of latent and active TB disease (Health Canada, 2012). Group at risk also includes poor urban homeless people, residents of long term and correctional facilities, health care workers and staff of long term facilities and of correctional facilities. Active TB is associated with a weakened immune system and can be a major risk factor or consequence from other diseases. People susceptible to active TB include: people living with HIV and AIDS, people receiving an organ transplant (due to the use immune suppressing drugs), people with silicosis, chronic kidney disease requiring dialysis, cancer of the neck and head. Those susceptible also include people infected with TB for the past two years with a chest X-ray showing sign of old TB, treatment with glucocorticoids, treatment with necrosis factor (TNF)-alpha inhibitors (for rheumatoid arthritis), all types of diabetes, people with a body mass index less than 20, under five year olds first infected with TB and people who smoke one or more packs of cigarette a day (Health Canada, 2012).

Note that a history of BCG vaccination may result in a false-positive reaction to the tuberculosis screening test (TST), which may complicate decisions about prescribing treatment. The presence or size of a TST reaction in persons who have been vaccinated with BCG does not predict whether BCG will provide any protection against TB disease (Centre for Disease Control [CDC] in Canada, 2011). BGC vaccination varies from province to province. For example, in
Saskatchewan clinical use of BGC began in 1933 and was discontinued in 1987. However, they continued to be used in some Aboriginal communities until was discontinued in most communities in September 2011. In Ontario, the vaccine is currently given to infants in Sioux and Lookout Zone (Health Canada, 2012). There is still currently, a lot of controversy regarding the use of BCG and since it is proven to be more effective in children. Children born in Aboriginal communities where the risk is high could still benefit from the BCG vaccine.

**Government Report**

Over the years, the Government of Canada has worked with Aboriginal people to develop strategies and policy in the fight against TB. Two major reports are discussed in this section.

**Joint Committee on Communicable Disease Control**

The Joint Committee on Communicable Disease Control was established in 1990 and drafted a TB control strategy in 1993. Recommendations included: centrally organized programs to develop, monitor, coordinate and evaluate TB control and TB treatment. The strategy also involved the availability of resources, partnerships between TB control programs, community health agencies and Aboriginal communities (Hoeppner & Marciniuk, 2000; PHAC, 2002).

**Health Canada’s Strategy**

An important document, the *TB Elimination Strategy* developed in 1992 through a partnership between the First Nations Health Branch (FNIHB) and the Assembly of First Nations (AFN) was updated and now titled *Health Canada’s strategy against tuberculosis for First Nations on-reserve* (Health Canada, 2012a). This strategy set out to ultimately eliminate TB beginning with reducing incidence rate to 1 per 100,000 people (Health Canada, 2012a).

**Strategies in Aboriginal Communities**
The process of detecting and adequately treating TB in vulnerable populations is particularly challenging. However, effective strategies have been adopted to curb the spread of TB (Ahamed et al., 2004). Effective TB control involves case finding of infectious people, investigation of contact with TB and treatment (Hershfield, 1999).

The implementation of directly-observed therapy short course (DOTS) has been a ‘breakthrough’ in the control of tuberculosis (Zaman, 2010). This standard treatment has been adopted in Canada for the treatment of TB. Current treatment involves the use of isoniazid (INH), rifampin (RMP), pyrazinamide (PZA) and ethambutol (EMB) (Hoeppner, Ward & Elwood, 2007). DOT has a number of benefits (including reduced drug resistance and relapse). At the same time, DOT might not be possible in every geographical location due to resource constraints. In such situations, priority has to be given to for instance, in cases of drug resistance. In Canada, DOT is recommended when self-administered treatment fail to meet the required standards (Hoeppner et al., 2007).

**Implications for Healthcare and Research**

Lower rates of TB from the 20th century have been attributed to improved living conditions, public health interventions and effective drug treatment (PHAC, 2002). Treatment has been one of the most effective ways to control the spread of TB but at the same time involves some cost to governments. Estimates of TB related health care expenditure in Canada in 2004 amounted to $74 million estimated at about $47,290 per active TB case per year. Research expenditure on TB accounted for $4.5 million (6% of the total) and non-research expenditure accounted for 6.3 million (22% of the total) (Menzies, Oxlade, & Lewis, 2006). Provincial and Territorial expenditure were the highest estimated at roughly 53 million. The Northern
Territories accounted for the highest expenditure and the Atlantic provinces for the lowest (Menzies et al., 2006). [Old reference]

Tuberculosis among Aboriginal peoples has been well researched, much of this has been due to collaborative research between non-Aboriginal researchers and Aboriginal organizations and communities. A strength of this kind of research is the increased organizational and community support (Boffa, King, McMullin, & Long, 2011).

Research has been crucial in the crusade against TB. Hoeppner and Marciniuk (2000) discussed “the important role of research in improving methods of diagnosis, prevention, vaccine efficacy, and treatment of the disease” (p. 145).

**Role of the Health Care Professional**

The health care professional’s roles in the prevention of TB include the identification of suspected and confirmed cases as well as diagnoses and treatment to protect public safety (Reference, year). Additionally, through the collaboration with other specialists, they are involved with prompt and complete reporting, effective case management, contact tracing, continuous medical education and outreach programs to groups more susceptible to the disease (Reference, year). Another important role is the provision of cultural appropriate treatment for TB patients, especially marginalized groups to remove the psychological barriers and increase adherence to treatment. According to Stirling and Enarson (2007) other roles include the coordination with HIV/AIDs programs for contact screening, planning evaluation and implementation, community partnerships as well as analysis and dissemination of surveillance data for local and regional scrutiny and comparison.

The Canadian Nurses Association (CNA, 2010) believes that cultural competence is the application of knowledge, skills, attitudes or personal attributes required by nurses to maximize
respectful relationships with diverse populations of clients and co-workers. “Underlying values for cultural competence are inclusivity, respect, valuing differences, equity and commitment” (Registered Nurses of Ontario, 2007, as cited in CNA, 2010).

**Discussion**

Tuberculosis has proven to be a very difficult disease to eradicate in the world and complicated even more with the advent of HIV and AIDS. There is continuous ongoing research effort especially for more efficacious vaccines and better treatments. Equally, important are policies that address the social determinants and risk factors that fuel the spread of the disease.

**Future Considerations**

From the earlier discussion, it is clear that TB can be combated if policies address socio-economic status and community involvement in disease management. Health research in this area is crucial in affecting policy decisions.

Educational interventions have proven above all to empower people on health issues. The role of the public health professional is crucial in educational campaigns including the provision of reading materials on facts about TB in various Aboriginal languages. Voluntary screening should be encouraged by the public health professional. Additionally, a tobacco cessation program should be designed and implemented in Aboriginal communities to help people quit smoking since it’s one of the risk factors. Funds should also be sourced externally to implement programs that provide supplementary nutrition to the vulnerable in Aboriginal communities. Another crucial role is the provision of culturally competent care, continuous health education to remove psychological barriers. Equally important is advocating for better policies that address the social determinants of health and other risk factors of TB. Priority should still be given to
research in vaccine development and continuous funding from government to support TB programs.

**Conclusion**

Tuberculosis has existed with mankind for decades but the recent HIV/AIDS pandemic creates an urgent need for measures to curtail this infectious disease. This paper has focused on the social determinants and other risk factors that make Aboriginal people more susceptible to TB such as historical factors, poverty, poor housing conditions and access to health care. Strategies explored were: continuous treatment with DOT and more effective drugs for those resistant to DOT regimens. Ongoing roles of the public health professional include advocating for policies that reduce the risk factors as well as educational interventions to reach out to all Aboriginal people in all geographical locations.
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