

RESEARCH PAPER

Food patterns and socioeconomic indicators of food consumption amongst Inuvialuit in the Canadian ArcticE. Erber,* L. Beck,[†] B. N. Hopping,* T. Sheehy,[‡] E. De Roose[§] & S. Sharma**

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Keywords

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Abstract

Background: Inuvialuit in the Canadian Arctic have been experiencing a nutrition transition resulting in a decrease in nutrient-dense food consumption, which may, in part, explain this population's increasing chronic disease rates. Because the available literature is limited, the present study aimed to document the extent of this transition by examining current dietary patterns and socioeconomic factors affecting food group consumption.

Methods: This cross-sectional study was conducted in three Inuvialuit communities in the Northwest Territories between 2007 and 2008. A validated food frequency questionnaire determined intake frequency of fruit and vegetables (FV), traditional foods (TF) and non-nutrient-dense foods (NNDF). Socioeconomic status (SES) was assessed by questions on education, ownership of items in working condition used to create a Material Style of Life (MSL) scale and residents in household employed/on income support. Daily intake frequencies were compared by gender and age group using Wilcoxon rank sum test. SES association with food group intake was determined using logistic regression.

Results: The response rate was 65–85%. One hundred and seventy-five participants were female and 55 were male, aged 19–84 years [mean (SD) 44 (14)]. Mean frequencies of FV and TF consumption were 1.6 (1.5) and 1.6 (1.7) times per day, respectively. NNDF were reported 9.2 (3.0) times per day. The highest MSL score (>12) was significantly associated with higher fruit (≥ 0.7 times per day) and higher TF intake (≥ 1.1 times per day) compared with the lowest score (≤ 7). An intermediate MSL score (8–12) was related to higher vegetable consumption (≥ 0.4 times per day).

Conclusions: NNDF were consumed approximately seven times more frequently than TF in the present study, indicating that the dietary transition is well underway amongst Inuvialuit. Participants with higher SES were more likely to consume nutrient-dense foods, suggesting possible cost barriers.

Introduction

Inuvialuit in the Northwest Territories (NWT), Canada, have undergone the transition from a traditional hunter-gatherer subsistence inclusive of nutrient-dense fish, wildfowl and marine and terrestrial mammals to a food pattern infiltrated with non-nutrient-dense foods (NNDF),

especially highly processed foods and sweetened drinks (Sharma, 2010a). The effects of this changing diet are compounded by lifestyle transitions resulting in decreasing levels of physical activity (Young *et al.*, 1998). The health, social and economic impacts of rapidly increasing rates of chronic disease risk factors amongst Inuvialuit communities are extremely damaging [Young *et al.*,

1998; Inuit Tapiriit Kanatami (ITK), 2008; Deering *et al.*, 2009; Health Canada, 2009]. Currently, approximately one-third of Inuvialuit in the NWT have at least one type of chronic disease and the life expectancy is nine years below the Canadian average (ITK, 2008; Erber *et al.*, 2010a).

Because the Inuvialuit diet continues to change, the replacement of high-energy NNDF with more traditional foods (TF) and fruit and vegetables (FV) is vital because they are superior in nutrient density and provide health benefits (Blanchet *et al.*, 2000; Steffen, 2006; Kuhnlein & Receveur, 2007). Unfortunately, the available literature on Inuvialuit is scarce, although barriers to dietary quality in similar populations, such as Inuit, include income-disparities, high cost, poor quality, limited variety and availability (Lawn & Harvey, 2003; Ricciuto & Tarasuk, 2007). Socioeconomic disparities in the consumption of FV are well-documented, with a strong positive correlation between high income and level of education and quantity of FV purchased and consumed (Krebs-Smith *et al.*, 1995; Pollard *et al.*, 2002; Kamphuis *et al.*, 2006; Ricciuto & Tarasuk, 2007). Studies amongst Inuvialuit and Inuit found that, in younger generations, food consumption patterns are changing towards greater reliance on shop-bought NNDF and less frequent consumption of TF (Kuhnlein *et al.*, 2004; Sharma *et al.*, 2009, 2010b; Hopping *et al.*, 2010). In addition, hunting was considered to be too expensive to undertake by up to 42.1% of Inuit and Inuvialuit (Lambden *et al.*, 2006).

Few studies have explored the relationship between dietary intake and socioeconomic status (SES) amongst Inuvialuit in the NWT. The present study aimed to describe the consumption frequency of FV, TF and NNDF amongst Inuvialuit adults and to examine the effect of socioeconomic factors on higher intake of FV, TF and NNDF.

Materials and methods

Recruitment and data collection

Recruitment procedures and data collection have been described in detail elsewhere (Sharma, 2010a). In brief, this cross-sectional study took place between July 2007 and July 2008. Households were randomly selected from three communities in the NWT, Canada, using government housing maps. Only one Inuvialuit per household, the main food shopper or preparer, older than 18 years and not pregnant or breastfeeding, was recruited. A validated quantitative food frequency questionnaire (QFFQ) used to determine food group intake was designed specifically for this population (Sharma *et al.*, 2009; Pakseresht & Sharma, 2010). The QFFQ covered 142 line items, including 16 fruit and vegetable items (excluding fruit juices, potato products and stir-fry with vegetables), 38 traditional food items and 33

NNDF items. SES was determined based on questions on education, ownership of household items in working condition, which was used to develop the Material Style of Life (MSL) scale (Sharma, 2010a), as well as residents in the household employed and residents in the household on income support.

Institutional Review Board approval was obtained from the Committee on Human Studies at the University of Hawaii and the Office of Human Research Ethics at the University of North Carolina at Chapel Hill, as well as the Beaufort Delta Health and Social Services Authority Ethics Review Committee. The Aurora Research Institute licensed the study.

Food groupings

The food group fruit included the QFFQ line items orange, apple, banana, pear, strawberries and other berries, grapes, fresh fruit salad, canned fruit in syrup, canned fruit in natural juice, frozen fruit and dried fruit, whilst the food group vegetables included the QFFQ line items carrot, cauliflower/broccoli, vegetable salad, frozen vegetables and canned vegetables. FV combined all the above mentioned fruit and vegetable line items. Fruit juices, potato products and stir-fry with vegetables were excluded from the analysis because juices consumed in the NWT are mainly high sugar beverages, such as Kool-Aid™ (Kraft Foods Inc., Northfield, IL, USA) or Tang™ (Kraft Foods Inc., Northfield, IL, USA), potato products are mostly processed, such as French fries or hash browns, and stir-fry usually contains only small amounts of vegetables. Traditional food items were categorised as: land foods, which were defined as traditional foods hunted from the land (including all QFFQ line items on caribou, muskox, moose, polar bear, as well as their organs and blood soup); sea foods, which were defined as traditional foods hunted from the sea [including all QFFQ line items on seal, muktuk (whale skin and fat), several types of local fish]; and sky foods, which were defined as traditional foods harvested from the sky (including all QFFQ line items on wild birds and their eggs). NNDF included the QFFQ line items on ice cream, cake/cheesecake, pie, pastries, biscuits, chocolate/chocolate bar, nondairy whitener, pizza, crackers, popcorn, crisps, hash browns or French fries, salad dressing, butter/margarine/lard, mayonnaise, gravy, sweetened drinks, sweetened juice, carbonated drinks, sweets, jelly, cereal bars, sugar, artificial sweetener, coffee and tea.

Statistical analysis

The mean, standard deviation (SD), median and interquartile range (IQR) were determined for daily intake

frequency of FV, TF and NNDF. Results are presented for all three communities combined, as well as by gender and age group (≤ 50 years, > 50 years). Age was initially categorised into four age groups (19–30, 21–50, 51–70 and > 70 years) in accordance with the age categories of the Dietary Reference Intakes (Institute of Medicine of the National Academies, 2005) but were collapsed into two groups as a result of the small sample size and unequal distribution amongst all four age groups. Differences in mean frequencies of daily consumption between gender and age groups were determined using Wilcoxon rank sum test because dietary intake was not normally distributed, even after log transformation. Although the sample sizes differ between men and women, as well as between age groups, comparisons are presented for completion. However, it should be noted that the small sample size of men and Inuvialuit > 50 years might not be representative.

SES indicators included education, MSL scale, residents in the household currently employed and residents in the household currently on income support. Associations between SES and higher food group consumption were determined. Higher food group consumption was defined as being above or equal to the median frequency of daily consumption, which was 1.2 (IQR = 1.3) times per day for FV, 0.7 (0.9) times per day for fruit, 0.4 (0.6) times per day for vegetables, 1.1 (1.6) times per day for TF, 0.6 (1.1) times per day for land foods, 0.3 (0.6) times per day for sea foods and 9.1 (3.9) times per day for NNDF. Because of the low intake of sky foods, this food group was not included in analysis. Odds ratios (OR) and 95% confidence intervals (CI) were calculated using logistic regression adjusted for gender and age (> 50 versus ≤ 50 years). Because of their high correlation, the SES indicators were mutually adjusted. The model for vegetables was additionally adjusted for body mass index, whilst the model for NNDF was additionally adjusted for smoking because these covariates improved model fit using log-likelihood tests.

All statistical analyses were performed using SAS statistical software, version 9.1 (SAS Institute, Inc., Cary, NC, USA). All tests and *P*-values were two-sided and considered statistically significant at $\alpha \leq 0.05$.

Results

A total of 230 participants, 55 men with a mean (SD) age of 42 (14) years and 175 women with a mean (SD) age of 45 (14) years completed food frequency questionnaires. The age of participants ranged from 19–84 years, and the response rates were in the range of 65–85% between communities. However, records on refusals were incomplete, which did not allow for an exact response rate calculation. For all participants, FV, TF

and NNDF consumption ranged from 0–9.1 times per day, 0–14.3 times per day and 2.9–19.5 times per day, respectively.

Fruit and vegetables

Mean frequency of daily FV consumption was reported to be 1.6 (SD = 1.5) times per day, intake of fruit alone was 1.0 (1.1) times per day and consumption of vegetables was 0.6 (0.6) times per day (Table 1). Women consumed fruit and vegetables combined 0.6 times per day more frequently than men ($P = 0.002$), as well as fruit 0.4 times per day ($P = 0.01$) and vegetables 0.17 times per day ($P = 0.01$) more often than men. Mean frequency of daily FV consumption did not differ by age group.

Traditional foods

Intake of TF was reported to be a mean (SD) of 1.6 (1.7) times per day (Table 1). Land-based TF were the most frequently consumed with a mean (SD) daily frequency of 1.0 (1.1) times per day, followed by sea foods with a mean (SD) consumption of 0.5 (0.7) times per day; sky foods were very infrequently consumed [0.1 (0.2) times per day]. Total TF intake did not differ by gender or age group. However, women consumed traditional sea foods significantly more frequently than men [0.6 (0.7) versus 0.3 (0.3) times per day, $P = 0.02$], and older Inuvialuit (> 50 years) consumed traditional sea foods 0.3 times per day more often than younger participants ($P = 0.01$).

Non-nutrient-dense foods

By contrast to FV and TF, NNDF were consumed a mean (SD) of 9.2 (3.0) times per day (Table 1), which was 7.6 times per day more frequently than FV and TF, respectively. Frequency of NNDF consumption did not differ significantly by gender or age. However, the mean daily consumption of NNDF was 0.3 times per day higher amongst women than men and 0.3 times per day higher amongst Inuvialuit ≤ 50 years than those > 50 years, although this was not statistically significant.

Socioeconomic status indicators

Participants with an MSL scale > 12 were more than twice as likely to have higher fruit intake (≥ 0.7 times per day) (OR = 2.23, 95% CI = 1.04–4.82), whilst participants with an MSL scale of 8–12 were significantly more likely to have a higher vegetable intake (≥ 0.4 times per day) (OR = 3.28, 95% CI = 1.36–7.89) compared with Inuvialuit with a score ≤ 7 (Table 2). With respect to TF consumption, Inuvialuit with a MSL scale of > 12

Table 1 Daily fruit and vegetable, traditional food and non-nutrient-dense food consumption amongst Inuvialuit adults overall, by gender and by age group, in the Northwest Territories, Canada [mean (standard deviation, SD) frequency]

Food group	Total (n = 230)		Men (n = 55)		Women (n = 175)		P-value	≤50 years (n = 161)		>50 years (n = 69)		P-value
	Mean	(SD)	Mean	(SD)	Mean	(SD)		Mean	(SD)	Mean	(SD)	
Fruit and vegetables*	1.6	(1.5)	1.2	(1.1)	1.8	(1.6)	0.002 ^{††}	1.6	(1.5)	1.7	(1.5)	0.73
Fruit [†]	1.0	(1.1)	0.7	(0.7)	1.1	(1.2)	0.01 ^{††}	1.0	(1.1)	1.1	(1.1)	0.46
Vegetables [‡]	0.6	(0.6)	0.5	(0.5)	0.7	(0.6)	0.02 ^{††}	0.6	(0.6)	0.6	(0.6)	0.93
Traditional foods	1.6	(1.7)	1.2	(1.1)	1.7	(1.9)	0.13	1.5	(1.5)	1.8	(2.2)	0.29
Traditional foods hunted from the land [§]	1.0	(1.1)	0.8	(0.8)	1.0	(1.2)	0.26	0.9	(1.0)	1.0	(1.3)	0.74
Traditional foods hunted from the sea [¶]	0.5	(0.7)	0.3	(0.3)	0.6	(0.7)	0.02 ^{††}	0.4	(0.5)	0.7	(0.9)	0.01 ^{††}
Traditional foods hunted from the sky ^{**}	0.1	(0.2)	0.1	(0.2)	0.1	(0.2)	0.44	0.1	(0.2)	0.1	(0.2)	0.25
Non-nutrient-dense foods	9.2	(3.0)	9.0	(2.8)	9.3	(3.1)	0.68	9.3	(3.0)	9.0	(3.1)	0.27

*Excluding fruit juice, potatoes and stir fry vegetables in meat dishes.

[†]Excluding fruit juice.

[‡]Excluding potatoes and stir fry vegetables in meat dishes.

[§]Including caribou, musk ox, moose, polar bear, rabbit/muskrat as well as their organs and blood soup.

[¶]Including seal, muktuk (whale skin and fat), several types of local fish and fish eggs.

^{**}Including wild birds and their eggs.

^{††}Statistically significant at $\alpha \leq 0.05$.

Table 2 Socioeconomic indicators of higher fruit and vegetable consumption amongst Inuvialuit adults in the Northwest Territories, Canada*

Variable	Category	n [†]	Fruit and vegetables [‡]	Fruit [§]	Vegetables [¶]
			OR (95% CI)**	OR (95% CI)**	OR (95% CI)**
Education	None – some junior high school	70	1.00	1.00	1.00
	Junior high school completed – high school completed	97	1.16 (0.57–2.39)	1.07 (0.52–2.17)	1.70 (0.75–3.84)
	Some college/trade school – university completed	55	1.43 (0.65–3.12)	1.49 (0.69–3.24)	1.76 (0.87–5.32)
Material Style of Life scale	≤7	61	1.00	1.00	1.00
	8–12	74	1.79 (0.83–3.85)	1.43 (0.67–3.03)	3.28 (1.36–7.89) ^{§§}
	>12	89	1.88 (0.86–4.09)	2.23 (1.04–4.82) ^{§§}	2.16 (0.87–5.32)
Employed household ^{††}	No	58	1.00	1.00	1.00
	Yes	165	1.57 (0.75–3.30)	1.02 (0.49–2.10)	1.07 (0.47–2.40)
Household on income support ^{‡‡}	No	153	1.00	1.00	1.00
	Yes	70	1.10 (0.56–2.14)	0.89 (0.46–1.71)	1.77 (0.83–3.77)

*Higher fruit and vegetable consumption was defined as ≥ 1.2 times per day; higher fruit consumption was defined as ≥ 0.7 times per day; higher vegetable consumption was defined as ≥ 0.4 times per day.

[†]Number of participants, might not add up to total *n* as a result of missing responses.

[‡]Excluding fruit juice, potatoes and stir fry vegetables in meat dishes.

[§]Excluding fruit juice.

[¶]Excluding potatoes and stir fry vegetables in meat dishes.

^{**}Odds ratio (OR) and 95% confidence interval (CI) adjusted for age, gender, education, material style of life, percentage of people in household currently working and percentage of people in household currently on income support; Vegetables also adjusted for body mass index.

^{††}At least one resident in the household is employed versus no residents are employed.

^{‡‡}At least one resident in the household is on income support versus no residents are on income support.

^{§§}Statistically significant at $\alpha \leq 0.05$.

were more than four times as likely to have a higher intake (≥ 1.1 times per day) compared with participants in the lowest category (OR = 4.37, 95% CI = 1.95–9.78) (Table 3). None of the SES indicators appeared to have an effect on higher frequency of NNDF intake (≥ 9.1 times per day) (Table 4).

Discussion

The results obtained in the present study are amongst the first data available to describe food patterns including FV, TF and NNDF amongst adult Inuvialuit. The study revealed that the mean frequency of NNDF was

Table 3 Socioeconomic indicators of higher traditional food consumption frequency amongst Inuvialuit adults in the Northwest Territories, Canada*

Variable	Category	n [†]	Traditional foods	Traditional foods hunted from the land [‡]	Traditional foods hunted from the sea [§]
			OR (95% CI) [¶]	OR (95% CI) [¶]	OR (95% CI) [¶]
Education	None – some junior high school	70	1.00	1.00	1.00
	Junior high school completed – high school completed	97	0.61 (0.30–1.26)	1.05 (0.53–2.11)	0.74 (0.37–1.49)
	Some college/trade school – university completed	55	0.68 (0.31–1.50)	1.18 (0.55–2.52)	0.97 (0.45–2.10)
Material style of life scale	≤7	61	1.00	1.00	1.00
	8–12	74	2.09 (0.96–4.54)	1.35 (0.64–2.81)	1.18 (0.55–2.53)
	>12	89	4.37 (1.95–9.78) ^{§§}	1.78 (0.84–3.77)	1.66 (0.77–3.60)
Employed household**	No	58	1.00	1.00	1.00
	Yes	165	1.02 (0.49–2.14)	1.02 (0.50–2.08)	1.00 (0.48–2.08)
Household on income support ^{††}	No	153	1.00	1.00	1.00
	Yes	70	1.62 (0.83–3.20)	0.96 (0.50–1.83)	1.21 (0.63–2.36)

*Higher traditional food consumption was defined as ≥ 1.1 times per day; higher land food consumption was defined as ≥ 0.6 times per day; higher sea food consumption was defined as ≥ 0.3 times per day.

[†]Number of participants, might not add up to total *n* as a result of missing responses.

[‡]Including caribou, musk ox, moose, polar bear, rabbit/muskrat as well as their organs and blood soup.

[§]Including seal, muktuk (whale skin and fat), several types of local fish and fish eggs.

[¶]Odds ratio (OR) and 95% confidence interval (CI) adjusted for age, gender, education, material style of life, percentage of people in household currently working and percentage of people in household currently on income support.

**At least one resident in the household is employed versus no residents are employed.

^{††}At least one resident in the household is on income support versus no residents are on income support.

^{§§}Statistically significant at $\alpha \leq 0.05$.

approximately seven times higher than the mean frequency of FV or TF. The mean frequency of daily consumption of FV as well as TF was < 2 times per day. This illustrates the dietary shift from nutritionally dense traditional dishes to NNDF and the inadequate intake of FV amongst Inuvialuit.

Because data on dietary intake amongst Inuvialuit are limited, the findings of the present study will also be compared with previous studies on similar Arctic populations, such as Inuit in Nunavut or Greenland. The low frequency of consumption of FV observed in the present analysis corroborates findings of previous studies amongst Inuit (Lawn & Harvey, 2004; Blanchet & Rochette, 2008) and may partially explain the low intakes of the vitamins A and C, total folate and dietary fibre previously observed in this sample of Inuvialuit (Sharma *et al.*, 2009; Erber *et al.*, 2010b). It has been shown that Inuit populations historically consumed 100% of their energy from TF, whilst, currently, less than one-quarter of dietary energy is derived from traditional foods and dishes (Berti *et al.*, 1999; Kuhnlein *et al.*, 2004; Sharma 2010a). The decline in TF consumption is of great concern because there is growing evidence that reverting to traditional diets offers more than just spiritual and cultural benefits, it also provides health benefits as a result of the high levels of

protein and fat-soluble vitamins and essential fatty acids found in traditional foods (Kuhnlein *et al.*, 1996; Blanchet *et al.*, 2000; Bjerregaard *et al.*, 2004; Kuhnlein & Receveur, 2007).

Age was not found to be significantly associated with consumption of the three food groups categorised in the present study. However, mean intake of TF was slightly lower amongst participants ≤ 50 years, whilst consumption of NNDF was higher amongst younger Inuvialuit, a finding that is supported by other studies (Kuhnlein *et al.*, 2004; Sharma *et al.*, 2009). This may contribute to nutritional inadequacies and higher rates of chronic disease and their risk factors amongst Inuvialuit in the future, and highlights the need for nutrition education being targeted particularly towards individuals < 50 years to promote a healthy diet.

It is important to recognise the social, environmental and economic factors that have affected the shift from TF to NNDF. In the present study, a high MSL score was associated with higher fruit, vegetable and TF intake. These findings agree with other studies showing a positive relationship between SES and intake of FV (Pollard *et al.*, 2002; Kamphuis *et al.*, 2006; Ricciuto & Tarasuk, 2007) and TF amongst Inuit populations (Hopping *et al.*, 2010). Others have stated that in addition to low levels of

Table 4 Socioeconomic indicators of higher consumption of non-nutrient-dense foods amongst Inuvialuit adults in the Northwest Territories, Canada*

Variable	Category	n [†]	Non-nutrient-dense foods OR (95% CI) [‡]
Education	None – some junior high school	70	1.00
	Junior high school completed – high school completed	97	0.80 (0.39–1.61)
	Some college/trade school – university completed	55	0.89 (0.41–1.91)
Material Style of Life scale	≤7	61	1.00
	8–12	74	1.75 (0.83–3.71)
	>12	89	1.39 (0.64–2.98)
Employed household [§]	No	58	1.00
	Yes	165	1.34 (0.65–2.76)
Household on income support [¶]	No	153	1.00
	Yes	70	1.31 (0.68–2.54)

*Higher non-nutrient-dense food consumption was defined as ≥ 9.1 times per day.

[†]Number of participants, might not add up to total *n* as a result of missing responses.

[‡]Odds ratio (OR) and 95% confidence interval (CI) adjusted for age, gender, education, material style of life, percentage of people in household currently working and percentage of people in household currently on income support and smoking status.

[§]At least one resident in the household is employed versus no residents are employed.

[¶]At least one resident in the household is on income support versus no residents are on income support.

livelihood skills and knowledge about hunting and TF preparation, affordability of hunting equipment also plays an important role in TF acquisition (Lambden *et al.*, 2006; Government of the NWT Department of the Environment and Natural Resources, 2009). The unique nature of food insecurity in remote Arctic communities reinforces the importance of continued efforts to revitalise TF acquisition and consumption and to improve accessibility and affordability of FV, especially amongst younger generations (Kendall *et al.*, 1996). In the NWT, 28% of people report food insecurity, compared with the national average of 15% (Ledrou & Gervais, 2005). Data on price differentials indicate that the cost of living in the NWT is 48–68% higher than in Edmonton, Alberta, the nearest Census Metropolitan Area (NWT Bureau of Statistics: Strategic Planning Branch, 2006). There is an urgent need for environmental interventions that increase physical and economic access to nutrient-dense foods.

Limitations of this study included self-reported food intake, which might have resulted in over-reporting,

under-reporting or omissions of certain foods. Furthermore, the study targeted the main food shopper and person responsible for preparing the food, resulting in a larger ratio of females to males represented in the sample. The small sample size in this study limited generalisability outside the three communities studied. Information on amounts of food groups consumed was not available for this analysis. However, frequency is usually associated with total amounts consumed.

This study has several strengths. For the first time, current data are available on the intake of FV, TF and NNDF in a remote population in the NWT to measure the effect of the nutrition transition. The QFFQs were collected between July 2007 and July 2008 and, therefore, captured seasonal variability. Furthermore, a culturally appropriate QFFQ specifically developed for the population was used to assess consumption (Sharma *et al.*, 2009).

This study identified a need to target the promotion of nutrient-dense foods, such as FV and TF, as healthier alternatives to NNDF and is a valid contribution to the generally limited literature on diet amongst Inuvialuit in the NWT. Future studies can use these cross-sectional data of food group consumption and their socioeconomic indices to illustrate the process of dietary change amongst Inuvialuit, but results may need to be confirmed by more studies with larger samples.

Conflict of interests, sources of funding and authorship

The authors declare that they have no conflicts of interest. The project was supported by American Diabetes Association Clinical Research award 1-08-CR-57, the Government of the Northwest Territories Department of Health and Social Services, Health Canada, the Public Health Agency of Canada and the Northwest Territories and Nunavut Public Health Association. SS developed the conception and design of the study. EDR oversaw all data collection and field activities. EE contributed to data analysis, and all authors were responsible for data interpretation. EE, BNH, LB, EDR, TS and SS drafted the manuscript. All authors critically reviewed its content and have approved the final version submitted for publication.

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