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RESEARCH PAPER

Healthy food intentions and higher socioeconomic status are associated with healthier food choices in an Inuit population

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Abstract

Background: Changing food behaviours amongst Canadian Inuit may contribute to rising chronic disease prevalence, and research is needed to develop nutritional behaviour change programmes. The present study examined patterns of food acquisition and preparation behaviours amongst Inuit adults in Nunavut and associations with psychosocial and socioeconomic factors.

Methods: Developed from behavioural theories and community workshops, Adult Impact Questionnaires were conducted with adult Inuit (≥19 years) from randomly selected households in three remote communities in Nunavut, Canada, to determine patterns of healthy food knowledge, self-efficacy and intentions, frequencies of healthy and unhealthy food acquisition and healthiness of preparation methods. Associations between these constructs with demographic and socioeconomic factors were analysed using multivariate linear regressions.

Results: Amongst 266 participants [mean (SD) age 41.2 (13.6) years; response rates 69–93%], non-nutrient-dense foods were acquired a mean (SD) of 2.9 (2.3) times more frequently than nutrient-dense, and/or low sugar/fat foods. Participants tended to use preparation methods that add fat. Intentions to perform healthy dietary behaviours was inversely correlated with unhealthy food acquisition ($\beta = -0.25$, $P < 0.001$), and positively associated with healthy food acquisition ($\beta = 0.22$, $P < 0.001$) and healthiness of preparation methods ($\beta = 0.15$, $P = 0.012$). Greater healthy food knowledge and self-efficacy were associated with intentions ($\beta = 0.21$, $P = 0.003$ and $\beta = 0.55$, $P < 0.001$, respectively). Self-efficacy was associated with healthier preparation ($\beta = 0.14$, $P = 0.025$) and less unhealthy food acquisition ($\beta = -0.27$, $P < 0.001$), whilst knowledge was associated with acquiring healthy foods ($\beta = 0.13$, $P = 0.035$). Socioeconomic status was positively associated with healthy preparation and food acquisition behaviours.

Conclusions: Interventions to improve diet in Nunavut Inuit should target healthy food intentions, knowledge and self-efficacy. Behaviour change strategies emphasising economic benefits of a healthy diet should be employed to target individuals of low socioeconomic status.

Introduction

The cultural, lifestyle and nutrition transition taking place in Inuit populations in Arctic Canada has been well-documented (Bjerregaard & Young, 1998; Bjerregaard *et al.*, 2004; Kuhnlein *et al.*, 2004; Sharma, 2010). Two components of this transition are the shift from subsistence food practices to increased reliance on shops as a source for foods and the introduction of new preparation methods, such as frying with lard, in addition to the traditional methods of boiling, drying or consuming foods in raw form. These dietary changes have led to decreased dietary quality and increased risk of obesity, diabetes, heart disease and other chronic diseases (Bjerregaard *et al.*, 2004; Anctil, 2008; Circumpolar Inuit Cancer Review Working Group *et al.*, 2008; Hopping *et al.*, 2010a; Sharma, 2010). Understanding dietary behaviours and their determinants is needed to develop intervention programmes that can produce sustained behaviour change to reduce risk of chronic disease and improve dietary adequacy.

In addition to environmental and economic factors (James *et al.*, 1997; Booth *et al.*, 2001; French *et al.*, 2001), psychosocial factors, such as knowledge and attitudes, are major influences on an individual's food choices and behaviours (Pollard *et al.*, 2002; Luszczynska *et al.*, 2004; Anderson *et al.*, 2007). According to the Social Cognitive Theory and Theory of Planned Behaviour, an individual's intentions to perform a behaviour and confidence in one's own ability to successfully perform a behaviour (i.e. 'self-efficacy') are key influences of behaviour (Bandura, 1986; Ajzen, 1991), including dietary behaviours (Brug *et al.*, 1995; Steptoe *et al.*, 2004; Anderson *et al.*, 2007).

Recent research conducted with US Aboriginal populations and First Nations in Canada has highlighted the connection between psychosocial factors of healthy food knowledge, self-efficacy and intentions, and dietary behaviours, and their probable contribution to obesity and diabetes (Gittelsohn *et al.*, 1998; Ho *et al.*, 2008a). However, these results cannot be generalised to Inuit populations that possess a culture, environment and diet distinctive from other populations. Limited research has been conducted on the influences of these factors amongst Canadian Aboriginal populations (Willows, 2005), highlighting the need for further research with Inuit in Arctic Canada.

The present study aimed to determine current patterns of food acquisition and preparation dietary behaviours amongst adult Inuit in Nunavut, Canada, as well as their associations with demographic and socioeconomic characteristics and the psychosocial factors of healthy food knowledge, self-efficacy and intentions.

Materials and methods

The present study took place with Inuit adults in three remote communities in the Arctic region of Nunavut. The setting and community characteristics have been described elsewhere (Sharma, 2010). The data presented are from an Adult Impact Questionnaire (AIQ), which was collected as part of a larger cross-sectional study (Sharma, 2010). In each household, the person who was primarily responsible for preparing and shopping for foods was targeted for recruitment, resulting in a predominantly female sample. The sampling strategy, data collection procedures and AIQ have been described elsewhere (Sharma, 2010). Briefly, the AIQ was developed from similar instruments used in previous intervention trials (Gittelsohn *et al.*, 2006; Ho *et al.*, 2008a) and on the basis of participatory community workshops held with community members and other key stakeholders, during which participants identified key foods and behaviours that should be promoted and de-promoted by the intervention (Gittelsohn *et al.*, 2010). Foods identified by the community as 'problem' foods and their healthier alternatives, which are accessible in the communities, were then incorporated into the AIQ. The instrument was finalised after pilot-testing with local community members.

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, and the Nunavut Research Institute licensed the study.

On the basis of Social Cognitive Theory and Theory of Planned Behaviour (Bandura, 1986; Ajzen, 1991), a series of scales were developed to measure three dietary behaviours of interest (i.e. healthiness of commonly used food prepartion methods, frequency of healthy food acquisition and frequency of unhealthy food acquisition) and three psychosocial constructs of interest (i.e. healthy food knowledge, self-efficacy and intentions). Scale descriptions can be found in Appendix S1, and examples of survey questions can be found in Appendix S2. In short, eight questions were used to assess knowledge level of healthy dietary practices, eight questions collected information to assess level of self-efficacy, and seven questions were used to assess level of intentions to perform healthy dietary behaviours in the future. The food preparation score captured the healthiness of methods used to prepare eight foods, and additive scales were calculated for the frequencies of acquisition of healthy and unhealthy foods from the resources available in the community (i.e. shop purchase, receipt from a food bank or family/friends, hunting and gathering, purchase

when travelling, Food Mail[1] or barge/sealift order) in the 30-day recall period.

The Material Style of Life (MSL) scale was a proxy for socioeconomic status (for details, see Sharma, 2010). The face validity of the MSL, the psychosocial and behavioural construct scales were evaluated by the researchers and community collaborators (e.g. Community Health Workers). The internal reliability of the scales was evaluated using the entire sample to calculate Cronbach's α (Bland & Altman, 1997). Most of the scales showed moderate to high internal reliability: MSL ($\alpha = 0.83$), healthy food knowledge ($\alpha = 0.58$), healthy food self-efficacy ($\alpha = 0.63$), healthy food intentions ($\alpha = 0.55$), healthy food acquisition ($\alpha = 0.67$), unhealthy food acquisition ($\alpha = 0.65$). Healthiness of food preparation had lower internal reliability ($\alpha = 0.46$).

Multivariate linear regressions (MLR) were used to assess the relationships of the three psychosocial and three behavioural constructs. All regression models were adjusted for age, gender, education [Low: none to some junior high school (HS); Intermediate: junior HS completed to HS completed; and High: some college to university completed] and socioeconomic factors, which included MSL scale (Low ≤7; Intermediate 8–12; and High >12), employed household (≥1 employed resident versus none) and household on income support (≥1 resident on income support versus none). Intentions and the two food acquisition scores were additionally adjusted for the number of people eating regularly in the household in the 30-day recall period. Healthy food knowledge, self-efficacy, and intention constructs were analysed in separate MLR models to account for collinearity. The self-efficacy and two food acquisition frequency dependent variables were transformed (cubic and square-root transformations, respectively) to account for non-normal residuals from the models. Standardised coefficients were reported, and differences with a $P \leq 0.05$ in a two-sided test were considered statistically significant. Statistical analyses were conducted using the software programme STATA/IC, version 10.1 (StataCorp LP, College Station, TX, USA).

Results

AIQs were collected from a random sample of 266 Inuit adults, with response rates ranging from 69–93% by community. The sample was largely female (80.8%), and the mean (SD) age was 41.2 (13.6) years. The study population has previously been described in detail (Sharma, 2010).

Patterns of healthy food knowledge, self-efficacy, intentions and behaviours

On average, respondents exhibited a moderate level of knowledge of healthy foods and dietary practices by responding correctly to 53% of the questions [mean (SD) score of 4.3 (1.9)] (Table 1), and only five participants answered all of the questions correctly (data not shown). Participants demonstrated high levels of healthy food self-efficacy [mean (SD) 25.8 (4.1) out of a maximum of 32] (Table 1). Participants reported a moderate level of intention to perform healthy dietary behaviours [mean (SD) 21.4 (4.1)], and the maximum response (32) was lower than the highest possible score (35), indicating that no respondents intended to perform healthy dietary behaviours all the time. Foods classified by community workshop participants as unhealthy as a result of high sugar, high fat and/or low nutrient content were acquired a mean (SD) of 2.9 (2.3) times more frequently than healthier alternatives in the 30-day recall period (Table 1). For example, participants reported procuring regular carbonated drinks 10.1 times versus diet carbonated drinks 0.8 times and normal popcorn 1.2 times versus lowfat popcorn 0.2 times in the 30-day recall period (data not shown). Traditional foods (i.e. caribou/muskox[2] and fish) were acquired a mean (SD) of 6.1 (6.1) times in the 30-day recall period (Table 1). The mean (SD) frequency of procuring the 24 healthy foods was 42.3 (24.2) times (range 0–157) and the nine unhealthy foods was 36.7 (23.7) times (range 0–126) in the 30-day recall period.

After accounting for the first and second most common preparation method for each food item, the results showed that the study population used methods that added fat content with a mean (SD) preparation score of −0.3 (1.6) (Table 1). The most common methods of food preparation utilised by participants' households in the 30-day recall period were boiling in a slow cooker[3], pan-frying in fat and baking without added fat (data not shown). Cooking spray use, frying then draining & rinsing and grilling were rarely reported as preparation methods. For locally hunted and gathered foods (i.e. seal, fish, muskox/caribou), traditional methods of raw, dried

[1]Food Mail is a government programme that subsidises air transportation costs of foods, including perishables, to food stores and individuals in remote and isolated Northern communities who subscribe to the programme (Indian and Northern Affairs Canada, 2009).

[2]Muskox is an Arctic land mammal of the Bovidae family.

[3]'Boiling in a slow cooker' is defined as boiling for a longer period of time without draining or skimming the fat.

Table 1 Healthy food knowledge, self-efficacy, intentions and dietary behavioural characteristics amongst adult Inuit in Nunavut, Canada

Construct	Mean (SD)	Range*	Minimum to maximum†
Healthy food knowledge score (n = 266)	4.3 (1.9)	0–8	0–8
Healthy food self-efficacy score (n = 265)	25.8 (4.1)	11–32	0–32
Healthy food intentions score (n = 265)	21.4 (4.1)	8–32	0–35
Frequency of traditional food acquisition (n = 266)	6.1 (6.1)	0–35	0–60
Frequency of healthy food acquisition‡ (n = 266)	42.3 (24.2)	0–157	0–720
Frequency of unhealthy food acquisition (n = 266)	36.7 (23.7)	0–126	0–270
Frequency ratio (unhealthy versus healthy foods)§ (n = 266)	2.9 (2.3)	1–15	1–30
Food preparation score (n = 264)	−0.3 (1.6)	−4.0 to 4.8	−8.0 to 8.0

*Range of respondents' scores.
†The possible minimum and maximum score for the data.
‡Includes traditional foods.
§Each participant's frequency was divided by the number of foods in its category (i.e. unhealthy food frequency divided by nine and healthy food frequency divided by 24) to generate an average, and then the average of unhealthy food acquisition was divided by the average of healthy food acquisition.

and boiling in a slow cooker were the most commonly used methods.

Factors associated with healthy food knowledge, self-efficacy and intentions

Participants with higher levels of education ($\beta = 0.30$, $P \leq 0.001$) and MSL scale ($\beta = 0.33$, $P < 0.001$) showed greater healthy food knowledge (Table 2). Those with a higher MSL scale also had greater healthy food self-efficacy ($\beta = 0.18$, $P = 0.006$) than those with a lower MSL scale (Table 3). However, healthy food knowledge was not significantly associated with self-efficacy. Higher levels of healthy food knowledge ($\beta = 0.21$, $P = 0.003$; data not shown) and self-efficacy ($\beta = 0.55$, $P < 0.001$) (Table 4) were associated with greater intentions to make healthier food choices in the next 30 days. Those who had more people eating at their households regularly demonstrated greater healthy food intentions. The models predicted 7–32% of the variations within these three constructs. The inclusion of self-efficacy in the model explained more than four times greater variation of healthy food intentions compared with the inclusion of healthy food knowledge.

Table 2 Multivariate linear regression of the associations between healthy food knowledge and socioeconomic and demographic constructs amongst adult Inuit in Nunavut, Canada*

	Healthy food knowledge R^2 adjusted = 0.19	
	Standard ß (SE)	P-value**
Education†	0.30 (0.17)	***<0.001***
MSL scale‡	0.33 (0.18)	***<0.001***
Employed household§	0.06 (0.26)	*0.37*
Household on income support¶	−0.10 (0.23)	*0.09*

*Adjusted for all constructs listed as well as age and gender.
†Education categories: none – some junior high school (HS), junior HS completed – HS completed, some college/trade school – university completed.
‡Material Style of Life (MSL) scale categories: ≤7, 8–12, >12.
§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.
**Bold values indicate statistical significance at $\alpha \leq 0.05$.

Table 3 Multivariate linear regression of the associations between healthy food self-efficacy and healthy food knowledge, socioeconomic and demographic constructs amongst adult Inuit in Nunavut, Canada*

	Healthy food self-efficacy† R^2 adjusted = 0.08	
	Standard ß (SE)	P-value††
Healthy food knowledge score	0.05 (275.17)	*0.49*
Age (years)	−0.13 (38.18)	***0.046***
Education‡	0.12 (800.34)	*0.09*
MSL scale§	0.18 (628.84)	***0.006***
Employed household¶	0.01 (1161.88)	*0.82*
Household on income support**	−0.09 (996.85)	*0.17*

*Adjusted for all constructs listed as well as gender.
†Cubic transformation to account for non-normal distribution of the residuals. Standard errors reported are from the cubic transformation.
‡Education categories: none – some junior high school (HS), junior HS completed – HS completed, some college/trade school – university completed.
§Material Style of Life (MSL) scale categories: ≤7, 8–12, >12.
¶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.
††Bold values indicate statistical significance at $\alpha \leq 0.05$.

Factors associated with dietary behaviours

Intention to make healthier food choices was the only construct significantly associated with all three food

Table 4 Multivariate linear regression of the associations between healthy food intentions and self-efficacy, socioeconomic and demographic constructs amongst adult Inuit in Nunavut, Canada*

	Healthy food intentions R^2 adjusted = 0.32	
	Standard ß (SE)	*P*-value**
Healthy food self-efficacy score	0.55 (0.05)	***<0.001***
Education†	−0.03 (0.36)	*0.57*
MSL scale‡	0.04 (0.29)	*0.53*
Employed household§	−0.004 (0.53)	*0.93*
Household on income support¶	0.02 (0.47)	*0.72*
Number of people eating regularly in the household	0.13 (0.08)	***0.025***

*Adjusted for all constructs listed as well as age and gender.
†Education categories: none – some junior high school (HS), junior HS completed – HS completed, some college/trade school – university completed.
‡Material Style of Life (MSL) scale categories: ≤7, 8–12, >12.
§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.
**Bold values indicate statistical significance at $\alpha \leq 0.05$.

Table 5 Multivariate linear regression of the associations between food preparation methods and healthy food intentions, socioeconomic and demographic constructs amongst adult Inuit in Nunavut, Canada*

	Food preparation score R^2 adjusted = 0.08	
	Standard ß (SE)	*P*-value**
Healthy food intentions score	0.15 (0.02)	***0.012***
Education†	0.07 (0.16)	*0.23*
MSL scale‡	−0.09 (0.13)	*0.15*
Employed household§	−0.01 (0.25)	*0.93*
Household on income support¶	−0.25 (0.21)	***<0.001***

*Adjusted for all constructs listed as well as age and gender.
†Education categories: none – some junior high school (HS), junior HS completed – HS completed, some college/trade school – university completed.
‡Material Style of Life (MSL) scale categories: ≤7, 8–12, >12.
§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.
**Bold values indicate statistical significance at $\alpha \leq 0.05$.

behaviours (i.e. preparation score, frequency of acquisition of healthy foods and of unhealthy foods), and most models including healthy food intentions consistently accounted for the highest amount of variance (Tables 5 and 6). Participants with greater healthy food intentions were more likely to have used healthy preparation methods ($\beta = 0.15$, $P = 0.012$) and have acquired healthy foods ($\beta = 0.22$, $P < 0.001$) and were less likely to have acquired unhealthy foods ($\beta = -0.25$, $P < 0.001$) than those with lower intention scores. Participants with higher healthy food self-efficacy also used healthier cooking methods ($\beta = 0.14$, $P = 0.025$) and obtained unhealthy foods less frequently ($\beta = -0.27$, $P < 0.001$), although self-efficacy was not associated with the acquisition of healthy foods (data not shown). Although healthy food knowledge was not statistically significantly associated with the preparation score or acquisition of unhealthy foods, it was positively associated with increased frequency of procuring healthy foods ($\beta = 0.13$, $P = 0.035$; data not shown).

Food behaviours were also significantly associated with socioeconomic and demographic indicators (Tables 5 and 6). In households with residents on income support, the healthiness score of food preparations used was lower ($\beta = -0.25$, $P < 0.001$) and the frequency of procuring unhealthy foods was higher ($\beta = 0.21$, $P = 0.001$) than households without residents on income support. On the other hand, households with employed residents had a higher frequency of procuring healthy foods ($\beta = 0.13$, $P = 0.026$) than households with no employed residents. Participants with higher level of MSL acquired both healthy and unhealthy foods more frequently than those with lower MSL ($\beta = 0.21$, $P = 0.001$, and $\beta = 0.12$, $P = 0.053$, respectively). Higher levels of education and younger age were also assocated with increased acquisition of unhealthy foods ($\beta = 0.13$, $P = 0.033$, and $\beta = -0.13$, $P = 0.029$, respectively). The models accounted for 6–22% of the variability in the behavioural scores.

Discussion

The present study provides data that were not previously available with respect to the associations between psychosocial dietary factors and their potential impact on dietary behaviours amongst Inuit. Acquisition of unhealthy foods was on average more frequent than the acquisition of healthier alternatives, including traditional foods, and preparation methods that added fat were used most often, which were also found in studies of other Aboriginal North American populations (Gittelsohn *et al.*, 2000, 2006; Archer *et al.*, 2004; Ho *et al.*, 2008a). Intention to acquire healthy foods and utilise healthy preparation methods was the factor most strongly associated with healthier dietary behaviours, supporting the Theory of Planned Behaviour conceptual framework (Ajzen, 1991). In addition to the number of people eating, the only variables strongly associated with intentions were healthy food knowledge and self-efficacy, indicating the importance of

Table 6 Multivariate linear regression of the associations between frequency of healthy food acquisition and healthy food intentions, socioeconomic and demographic constructs amongst adult Inuit in Nunavut, Canada*

	Acquisition of healthy foods† R^2 adjusted = 0.22		Acquisition of unhealthy foods† R^2 adjusted = 0.21	
	Standard ß (SE)	*P*-value††	Standard ß (SE)	*P*-value††
Healthy food intentions score	0.22 (0.03)	***<0.001***	−0.25 (0.03)	***<0.001***
Age (years)	−0.01 (0.01)	*0.87*	−0.13 (0.01)	***0.029***
Education‡	−0.02 (0.17)	*0.70*	0.13 (0.18)	***0.033***
MSL scale§	0.21 (0.14)	***0.001***	0.12 (0.15)	***0.053***
Employed household¶	0.13 (0.26)	***0.026***	0.07 (0.27)	*0.27*
Household on income support**	0.03 (0.23)	*0.66*	0.21 (0.24)	***0.001***

*Adjusted for all constructs listed as well as gender and number of people eating.
†Square root transformation to account for non-normal distribution of the residuals. Standard errors reported are from the square root transformation.
‡Education categories: none – some junior high school (HS), junior HS completed – HS completed, some college/trade school – university completed.
§Material Style of Life (MSL) scale categories: ≤7, 8–12, >12.
¶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.
††Bold values indicate statistical significance at $\alpha \leq 0.05$.

targeting these factors in an intervention to increase intentions, particularly self-efficacy. By contrast, healthy food knowledge was not strongly associated with self-efficacy, suggesting that increased knowledge of a healthy diet does not necessarily lead to greater self-confidence in an individual's abilities to engage in healthy food behaviours in this setting.

Households with low socioeconomic status - as indicated by residents on income support, unemployed residents and lower MSL scale - generally practiced fewer healthy dietary behaviours, with the exception of acquisition of unhealthy foods. These results suggest that financial resources have a significant impact on one's ability to engage in healthier dietary behaviours in this setting and indicate the need for interventions to address healthy eating and preparation on a small budget. Poverty levels amongst Inuit and food prices in Arctic communities tend to be much higher than the Canadian average (Damman *et al.*, 2008). These findings, which were previously unavailable, are essential for identifying modifiable factors to target in nutritional behaviour change strategies to reduce risk of chronic disease in a population already experiencing a disproportionately high burden of disease compared with the general Canadian population (Bjerregaard *et al.*, 2004; Anctil, 2008; Circumpolar Inuit Cancer Review Working Group *et al.*, 2008; Sharma, 2010). The study participants consumed fruit and vegetables approximately 1.6 times per day versus 6.3 times for non-nutrient-dense foods, as well as high total fat and low dietary fibre intake (Hopping *et al.*, 2010a,b). Diet-related psychosocial factors and behaviours, such as those addressed in the present study, are important determinants of fruit, vegetable, dietary fibre, and total and saturated fat intakes (Glanz *et al.*, 1998; Van Duyn *et al.*, 2001; Watters & Satia, 2009). By targeting these factors and behaviours in an intervention programme, public health professionals can produce sustained dietary changes in the population (Glanz *et al.*, 1998; Van Duyn *et al.*, 2001) and reduce risk of obesity, cancer, diabetes and heart disease (Ness & Powles, 1997; Abdulla & Gruber, 2000; Langlois *et al.*, 2009; Du *et al.*, 2010).

Many interventions focus on the transfer of knowledge through nutrition education as their main component with some success (Glanz, 1985). However, a programme in the present study population should expand on this approach. These results suggest that nutrition interventions should focus on increasing individuals' intentions to eat healthier in order to affect their behaviours, and to accomplish this education to improve healthy food knowledge and skills training to increase self-efficacy must be provided. Community-wide activities that allow individuals to learn and practice new, healthier dietary skills, such as cooking classes or in-shop demonstrations of shopping on a budget, would be important in building self-efficacy. For example, pan-frying in fat was one of the most popular cooking methods reported; therefore, activities could train individuals in healthier alternatives of cooking with cooking spray, frying and draining the fat, as well as frying, draining and rinsing. Another strategy that has effectively increased intentions and changed dietary behaviours in other populations is goal setting, in which nutrition educators help individuals set specific, measureable goals for behaviour change (Bandura, 1991; Shilts *et al.*, 2004).

An environmental, point-of-purchase intervention in the food shops would likely be highly successful in this

setting. Interventions conducting activities at the point-of-purchase, such as taste tests, cooking demonstrations, increasing availability and accessibility of healthy foods, and identifying healthy foods with shelf labels, have been successful in improving dietary behaviours amongst First Nations and other populations (Seymour *et al.*, 2004; Ho *et al.*, 2008b). Moreover, only two small food shops and few other food sources are available in each community, making an environmental intervention easier to implement and highly effective. Additionally, partnerships with food retailers to change the food environment would be essential, particularly for improving the diet of low income populations (Drewnowski & Darmon, 2005).

The present study has several limitations. The sample was largely female, and therefore its representation of Inuit men was limited. However, the present study targeted Inuit adults in the household primarily responsible for food shopping and preparing, who are mainly women. In addition, the generalisability of the results to other Inuit communities is limited. The refusal rate was up to 31%, which may signify nonresponse bias. Those who participated may be more health conscious, and therefore have higher levels of healthy food knowledge, self-efficacy and intentions, and engage in healthier behaviours more than those who declined participation. Another limitation was the regression models accounting for a modest amount of the variance, which is consistent with previous studies (Backman *et al.*, 2002; Robinson & Smith, 2002; Gittelsohn *et al.*, 2006; Ho *et al.*, 2008a). Despite this limitation, the present study provides useful guidelines for dietary behaviour change strategies in this setting. All of the food items listed in the food acquisition frequency section are regularly available in the communities, although the present study did not account for actual availability of the foods and other items during the study period, which can also have significantly influenced behaviour (Glanz *et al.*, 2005). Although these data are very useful for dietary behaviour change strategies within this population, it should be noted that they cannot be extrapolated to actual dietary consumption and nutrient intake for this population. Other studies have shown that food preparation methods are a primary determinant of fat intake (Snyder *et al.*, 1994; Burghardt *et al.*, 1995) and a risk factor for impaired glucose intolerance (Gittelsohn *et al.*, 1998). Further research is needed to connect these dietary psychosocial factors and behaviours to actual diet amongst Inuit.

Given the lack of scientific literature on current dietary behaviours and healthy food knowledge and attitudes amongst Canadian Inuit, the present study has identified important factors for nutrition interventions employing behaviour change strategies to target in this high-risk population. To successfully increase acquisition of healthy foods, decrease acquisition of unhealthy foods, and improve the healthiness of food preparation methods used, nutrition programmes should target healthy food knowledge, self-efficacy and intentions. Understanding these dietary behaviours and their determinants is important for intervention programmes to produce sustained behaviour change to improve dietary adequacy and reduce risk of chronic disease in Inuit communities.

Conflict of interests, source of funding, and authorship

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