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RESEARCH PAPER

Important psychosocial factors to target in nutrition interventions to improve diet in Inuvialuit communities in the Canadian Arctic

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Abstract

Background: With increasing chronic disease amongst Inuvialuit in the Canadian Arctic, research on dietary behaviours and their determinants in this population is needed to develop nutritional behaviour change intervention strategies. The present study aimed to assess the knowledge, self-efficacy and intentions towards healthy eating and healthy eating behaviours of Inuvialuit adults in the Northwest Territories (NWT), Canada.
Methods: The Adult Impact Questionnaire was developed from behavioural theories and workshops held in the communities. It was conducted with adult Inuvialuit (≥19 years) from randomly selected households in three NWT communities to collect data on the psychosocial constructs of healthy food knowledge, self-efficacy and intentions, and the dietary behaviours of healthy and unhealthy food acquisition and preparation. Associations between demographic, socioeconomic, psychosocial constructs and behaviours were analysed using multivariate linear regression.
Results: The 228 participants [mean (SD) age 43.4 (13.6) years; response rates 65–85%] acquired non-nutrient-dense foods a mean (SD) of 2.7 (3.0) times more frequently than nutrient-dense, low sugar and low fat foods. Increased intention was associated with a greater frequency of acquiring healthy foods ($\beta = 0.17$, $P = 0.012$) and a lower frequency of acquiring unhealthy foods ($\beta = -0.18$, $P = 0.008$). Overall, participants reported using food preparation methods that reduce fat content slightly more than methods that add fat [mean (SD) score 0.3 (1.9)]. Use of healthier food preparation methods was associated with higher levels of healthy food knowledge ($\beta = 0.26$, $P < 0.001$), self-efficacy ($\beta = 0.29$, $P < 0.001$) and intentions ($\beta = 0.22$, $P = 0.001$).
Conclusions: Healthy food intention was the construct most significantly associated with all three healthier dietary behaviours. Interventions that target intentions to change food choice and preparation may be effective strategies to improve dietary intake in Inuvialuit populations.

Introduction

The rapid dietary and lifestyle changes occurring amongst Inuvialuit in the Arctic region of the Northwest Territories (NWT), Canada, have created a double burden of undernutrition and chronic disease in this population (Popkin, 1998; Damman *et al.*, 2008). Compared with the general Canadian population, Inuvialuit have disproportionately high rates of obesity and chronic diseases, such as certain cancers and heart disease, as well as numerous

dietary inadequacies (Bjerregaard *et al.*, 2004; Circumpolar Inuit Cancer Review Working Group *et al.*, 2008; Erber *et al.*, 2010a; Sharma, 2010). By understanding the determinants of dietary behaviours amongst Inuvialuit, public health professionals can begin to address this emerging health crisis. According to the Theory of Planned Behaviour and Social Cognitive Theory, the interaction of environmental factors (e.g. food availability, cost) and psychosocial factors (e.g. knowledge, self-efficacy[1] and attitudes) influence an individual's behavioural intentions, which in turn affect, and best predict, human behaviour (Bandura, 1986; Ajzen, 1991; DeBarr, 2004).

These theories have been successfully applied to the dietary behaviours of many populations (Lewis *et al.*, 1989; Armitage & Conner, 2001; Brug *et al.*, 2006), yet gaps in the scientific literature exist on the influences of diet in Inuvialuit and other Canadian Aboriginal populations (Willows, 2005). Studies amongst Aboriginal populations in northwestern Ontario and Arizona have shown a significant association of healthy food knowledge, self-efficacy and intentions with healthier dietary behaviours and reduced risk of obesity and diabetes (Gittelsohn *et al.*, 1998, 2006; Ho *et al.*, 2008a). However, studies applying these behavioural theories to diet in other populations cannot characterise the factors that affect dietary choices amongst Inuvialuit, who comprise a unique people with a history, culture and environment distinctive from any other population. Therefore, research into the factors that affect dietary behaviour amongst Inuvialuit is necessary to implement effective behaviour change strategies to improve dietary intake and reduce chronic disease risk in this setting.

The present study aimed to describe healthy food knowledge, self-efficacy and intentions, and patterns of food acquisition and preparation, and the associations between these constructs, population demographics and socioeconomic factors amongst adult Inuvialuit in the Arctic region of the NWT.

Materials and methods

The present study reports the results of data collected from the Adult Impact Questionnaire (AIQ) used in a larger cross-sectional study (Sharma, 2010). Using similar instruments as the basis (Gittelsohn *et al.*, 2006; Ho *et al.*, 2008a), the AIQ was developed from participatory community workshops, during which community members and other key stakeholders identified the 'problem' foods and dietary behaviours in their communties and their healthier alternatives (Gittelsohn *et al.*, 2010). These foods and behaviours were then incorporated into the AIQ questions, and the instrument was finalised after pretesting. The survey was administered to adult Inuvialuit in one semi-remote and two remote Arctic communities in the NWT and targeted the person in the household primarily responsible for preparing and shopping for food, which resulted in a predominantly female sample. The setting and study population have been described elsewhere (Sharma, 2010). The AIQ collected data on healthy food knowledge, self-efficacy and intentions, as well as the dietary behaviours of healthiness of commonly used food preparation methods and frequency of healthy and unhealthy food acquisition. The sampling strategy, AIQ and data collection procedures have been described elsewhere (Sharma, 2010).

Associations between the psychosocial factors and dietary behaviours were assessed using scales that were developed based on the Social Cognitive Theory and the Theory of Planned Behaviour (Bandura, 1986; Ajzen, 1991). Descriptions of these scales are located in Appendix S1, and examples of survey questions for each scale are located in Appendix S2. In short, the healthy food knowledge score was an eight question assessment of participants' level of knowledge about healthy foods and preparation methods, and the healthy food self-efficacy score was an eight question assessment of participants' confidence in their own ability to successfully perform healthy dietary behaviours. The healthy food intentions score was a seven question assessment of participants' intention to perform a healthy dietary behaviour in the next 30 days. Participants were asked how many times they had acquired nine unhealthy foods and 24 healthy foods (for descriptions, see Appendix S1) during the 30-day recall period from one of the following sources: shop purchase, receipt from a food bank or family/friends, hunting and gathering, purchase when travelling, Food Mail[2] or barge order. These data were then added to create frequency of food acquisition for healthy foods and for unhealthy foods during the 30-day recall period. The food preparation score assessed the healthiness of preparation methods used to prepare eight different foods [i.e. bannock (fried bread), chicken, pork/beef, fish, seal, muskox[3]/caribou and eggs] during the 30-day recall period.

[1]Self-efficacy is defined as one's belief that one is capable of successfully performing a behaviour (Bandura, 1986).

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

[3]Muskox is an Arctic land mammal belonging to the Bovidae family.

The Material Style of Life (MSL) scale was used as a proxy for socioeconomic status (Sharma, 2010). The internal reliability of the MSL and healthy food knowledge, self-efficacy and intentions, and behavioural scales were evaluated using the entire sample to calculate Cronbach's α (Bland & Altman, 1997), whilst the face validity of the AIQ was assessed by the researchers and community collaborators (e.g. Community Health Workers). The scales showed moderate to high internal reliability: MSL ($\alpha = 0.84$), healthy food knowledge ($\alpha = 0.66$), healthy food self-efficacy ($\alpha = 0.75$), healthy food intentions ($\alpha = 0.64$), acquisition of healthy ($\alpha = 0.75$) and unhealthy foods ($\alpha = 0.73$), and food preparation score ($\alpha = 0.56$).

Multiple linear regressions (MLR) were performed to ascertain the relationships between healthy food knowledge, self-efficacy and intention constructs with the three behaviours. Each MLR model was adjusted for age, gender and socioeconomic indicators, which included educational level [Low: none to some junior high school (HS); Intermediate: junior HS completed to HS completed; and High: some college to university completed], MSL scale (Low <8; Intermediate 8–12; and High >12), household employment status (household has at least one employed resident versus none) and income support status of the household (household has at least one resident on income support versus none). Healthy food knowledge, self-efficacy and intention constructs were analysed in separate MLR models to account for collinearity. To adjust for non-normally distributed residuals in the models, the self-efficacy and frequencies of healthy and unhealthy food acquisition dependent constructs were transformed using square and square-root transformations, respectively. Standardised coefficients were reported, and values with a $P \leq 0.05$ in a two-sided test were considered statistically significant. Statistical analysis was conducted using Stata/IC, version 10.1 software (StataCorp LP, College Station, TX, USA).

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.

Results

A total of 231 individuals participated, although three respondents were excluded from the analysis because interviewers indicated respondent confusion and therefore did not complete most of the survey (eight out of 12 sections incomplete). The recorded response rates of the Adult Impact Questionnaires (AIQs) were in the range 65–85%, although these are estimates based on somewhat incomplete data collection records. The mean (SD) age of the 228 participants was 43.4 (13.6) years, and 77.2% of participants were female.

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

Overall, the participants demonstrated intermediate levels of food knowledge and intentions to acquire, prepare and consume healthier foods [mean (SD) scores of 4.5 (2.1) and 20.5 (4.8), respectively], and high levels of self-efficacy [mean 25.6 (4.9)] (Table 1). Of the responses to the food knowledge questions, 43.3% were incorrect (data not shown). The mean (SD) frequency of acquiring the nine foods defined as unhealthy was 32.0 (26.8) and the 24 foods defined as healthy was 41.1 (31.5) (Table 1). For

Table 1 Food-related knowledge, self-efficacy, intentions and behavioural characteristics amongst adult Inuvialuit in the Northwest Territories, Canada

Construct	Mean (SD)	Range*	Minimum to maximum†
Healthy food knowledge (n = 228)	4.5 (2.1)	0–8	0–8
Healthy food self-efficacy (n = 228)	25.6 (4.9)	9–32	0–32
Healthy food intentions (n = 228)	20.5 (4.8)	9–35	0–35
Frequency of traditional food acquisition (n = 228)	4.9 (6.2)	0–34	0–60
Frequency of healthy food acquisition‡ (n = 228)	41.1 (31.5)	0–153	0–720
Frequency of unhealthy food acquisition (n = 228)	32.0 (26.8)	0–185	0–270
Frequency ratio (unhealthy versus healthy foods)§ (n = 228)	2.7 (3.0)	0–26	0–30
Food preparation score (n = 226)	0.3 (1.9)	−8–6	−8–8

*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.

example, regular carbonated drinks were acquired 9.3 times versus 1.4 times for diet carbonated drinks, and white bread was acquired 3.9 times versus 1.9 times for 60% or 100% whole wheat bread in the 30-day recall period (data not shown). After adjusting for the number of foods defined as healthy versus unhealthy, unhealthy foods were acquired a mean (SD) of 2.7 (3.0) times more often during the 30-day recall period than healthy food items (Table 1). Traditional foods (i.e. caribou/muskox, fish) were acquired a mean (SD) of 4.9 (6.2) times during the 30-day recall period.

After weighing the first and second most commonly used preparation methods across the eight surveyed foods, the study population was determined to have a mean (SD) preparation score of 0.3 (1.9), indicating slightly greater use of methods that reduce fat content (Table 1). The most commonly used preparation methods were boiling in a slow cooker[4], pan-frying in fat and baking without added fat, whilst cooking with only cooking spray and frying followed by draining & rinsing were rarely reported (data not shown).

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

Participants with higher levels of education had greater levels of food knowledge than those with lower levels of education ($\beta = 0.14$, $P = 0.030$) (Table 2). Knowledge also increased with higher levels of MSL ($\beta = 0.33$, $P < 0.001$) and decreased with age ($\beta = -0.30$, $P < 0.001$). Increasing food knowledge was associated with increasing self-efficacy ($\beta = 0.39$, $P < 0.001$) (Table 3). Participants living in a household whose residents were on income support felt less efficacious making healthy food choices than those households not on income support ($\beta = -0.15$, $P = 0.027$). Both increased food knowledge ($\beta = 0.37$, $P < 0.001$; data not shown) and increased self-efficacy ($\beta = 0.65$, $P < 0.001$) (Table 4) were associated with increased intentions to consume healthy foods and use healthy preparation methods. In addition, participants living in households that were on income support had greater intentions to eat healthy compared with households that were not on income support ($\beta = 0.12$, $P = 0.036$). The inclusion of knowledge and self-efficacy in the models for healthy food intentions accounted for 15% and 45% of the variability, respectively.

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

	Healthy food knowledge R^2 adjusted = 0.22	
	Standard β (SE)	*P*-value**
Age (years)	−0.30 (0.01)	***<0.001***
Education†	0.14 (0.18)	***0.030***
MSL scale‡	0.33 (0.18)	***<0.001***
Employed household§	0.05 (0.32)	*0.50*
Household on income support¶	−0.01 (0.29)	*0.89*

*Adjusted for all constructs listed as well as 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 statistically significant 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 Inuvialuit in the Northwest Territories, Canada*

	Healthy food self-efficacy† R^2 adjusted = 0.15	
	Standard β (SE)	*P*-value††
Healthy food knowledge score	0.39 (7.86)	***<0.001***
Education‡	0.02 (20.75)	*0.71*
MSL scale§	−0.03 (3.57)	*0.70*
Employed household¶	0.01 (36.99)	*0.95*
Household on income support**	−0.15 (33.84)	***0.027***

*Adjusted for all constructs listed as well as age and gender.
†Squared to account for non-normal distribution of the residuals. Standard errors reported are from the square 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 statistically significant at $\alpha \leq 0.05$.

Factors associated with dietary behaviours

Intention to consume healthy foods and utilise healthy cooking methods in the future was the only construct significantly associated with all three behaviours of interest; therefore, models including intention are the only ones presented in the tables (Tables 5 and 6). Participants with greater intentions were more likely to report using

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

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

	Healthy food intentions R^2 adjusted = 0.45	
	Standard β (SE)	*P*-value**
Healthy food self-efficacy score	0.65 (0.05)	***<0.001***
Education†	−0.02 (0.35)	*0.64*
MSL scale‡	0.07 (0.33)	*0.24*
Employed household§	0.10 (0.62)	*0.07*
Household on income support¶	0.12 (0.58)	***0.036***

*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 Inuvialuit in the Northwest Territories, Canada*

	Food preparation score R^2 adjusted = 0.06	
	Standard β (SE)	*P*-value**
Healthy food intentions score	0.22 (0.03)	***0.001***
Education†	0.06 (0.18)	*0.41*
MSL scale‡	0.13 (0.17)	*0.08*
Employed household§	−0.05 (0.33)	*0.52*
Household on income support¶	0.03 (0.30)	*0.71*

*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 $\alpha \leq 0.05$.

healthier preparation methods ($\beta = 0.22$, $P = 0.001$), have a higher frequency of acquiring healthy foods ($\beta = 0.17$, $P = 0.012$) and have a lower frequency of acquiring unhealthy foods ($\beta = -0.18$, $P = 0.008$) compared with those with lesser intentions. Healthy food knowledge ($\beta = 0.26$, $P < 0.001$) and self-efficacy ($\beta = 0.29$, $P < 0.001$) were also positively correlated with a healthier food preparation score (data not shown). Healthy food self-efficacy was not strongly associated with frequency of acquiring healthy foods, although it was strongly associated with decreased frequency of acquiring unhealthy foods ($\beta = -0.22$, $P = 0.001$; data not shown). Healthy food knowledge was not significantly associated with either of the food acquisition behavioural outcomes.

Several demographic and economic factors were associated with the food behaviours (Tables 5 and 6). Older participants tended to acquire unhealthy foods less frequently than younger participants ($\beta = -0.18$, $P = 0.010$). Participants with greater levels of education acquired both healthy and unhealthy foods more frequently than those with lower levels ($\beta = 0.26$, $P < 0.001$, and $\beta = 0.17$, $P = 0.016$, respectively), and employed households and households on income support acquired unhealthy foods more frequently than unemployed households and households not on income support ($\beta = 0.20$, $P = 0.008$, and $\beta = 0.15$, $P = 0.035$, respectively). However, none of the demographic and economic factors were associated with healthiness of food preparation score, and the socioeconomic status proxy (MSL scale) was not significantly associated with any of the behaviours. The regression models were limited in their ability to account for the variability within the behavioural outcomes, ranging from 6% to 15%.

Discussion

These findings add to the limited literature on the factors associated with food behaviours amongst Inuvialuit of the NWTs and provide important information to inform nutrition intervention programmes employing a behaviour change strategy. High fat, high sugar and non-nutrient-dense shop-bought foods were acquired more often in the 30-day recall period than the healthier alternatives, which is consistent with research amongst other Aboriginal North American populations (Gittelsohn *et al.*, 2006; Ho *et al.*, 2008a). Although the study population overall used preparation methods that reduced fat content, the mean (SD) score 0.3 (1.9) was very low compared with the maximum possible score of 8.0, indicating an almost equal use of food preparation methods that added and reduced fat content. These findings indicate the need for a programme to improve dietary behaviours in this population. Although the data are not an assessment of dietary intake in this population, other studies have connected these behaviours to dietary intake (Snyder *et al.*, 1994; Burghardt *et al.*, 1995).

The results obtained in the present study suggest that the healthy food knowledge, self-efficacy and intentions of Inuvialuit adults have a significant impact on their food

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

	Acquisition of healthy foods† R^2 adjusted = 0.12		Acquisition of unhealthy foods† R^2 adjusted = 0.13	
	Standard β (SE)	*P*-value††	Standard β (SE)	*P*-value††
Healthy food intentions score	0.17 (0.04)	***0.012***	−0.18 (0.03)	***0.008***
Age (years)	0.07 (0.01)	*0.298*	−0.18 (0.01)	***0.010***
Education‡	0.26 (0.25)	***<0.001***	0.17 (0.23)	***0.016***
MSL scale§	0.11 (0.25)	*0.17*	0.08 (0.24)	*0.29*
Employed household¶	0.10 (0.46)	*0.18*	0.20 (0.43)	***0.008***
Household on income support**	0.07 (0.42)	*0.34*	0.15 (0.39)	***0.035***

*Adjusted for all constructs listed as well as gender and no. of people eating regularly in the household.

†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 $\alpha \leq 0.05$.

choices. All three of these modifiable psychosocial factors have been shown to be significantly associated with dietary intake amongst other populations in the literature. They are important predictors of higher fruit and vegetable consumption, higher fibre intake and lower total and saturated fat intake (Glanz *et al.*, 1998; Van Duyn *et al.*, 2001; Watters & Satia, 2009), which are associated with a decreased risk of obesity, cancer and other chronic illnesses (Ness & Powles, 1997; Abdulla & Gruber, 2000; Langlois *et al.*, 2009; Du *et al.*, 2010). The current diet of the study population consists of a high intake of fat and saturated fat, low intake of dietary fibre and consumption of fruits and vegetables less than twice a day (Erber *et al.*, 2010a,b). In addition to dietary intake, psychosocial factors are significantly associated with enacting and maintaining healthy dietary changes (Glanz *et al.*, 1998; Van Duyn *et al.*, 2001). Therefore, they present a critical opportunity for intervention to reduce risk of chronic disease and improve dietary adequacy amongst Inuvialuit, who are already a high-risk population.

Supporting the Theory of Planned Behaviour (Ajzen, 1991), intention to perform a healthy food behaviour was the only factor associated with all three healthy dietary behaviours, and healthy food knowledge and self-efficacy were significantly associated with intentions. Therefore, intention is an important factor to target in nutrition interventions in Inuvialuit communities. Although nutrition education is a key component of many interventions to improve diet (Glanz, 1985), in the present study population, food knowledge was associated with only one dietary behaviour, and the models containing knowledge accounted for the least amounts of variance. These findings demonstrate the need to expand beyond the transfer of knowledge to achieve healthy dietary behaviour change.

Environmental interventions in food shops, such as those that aim to increase availability and accessibility of healthy foods and use shelf labels to identify healthy foods, have been successful in changing dietary behaviours amongst other populations (Seymour *et al.*, 2004; Ho *et al.*, 2008b). A point-of-purchase, environmental intervention would likely be effective in the study setting because of the remoteness of the communities and limited food sources available. In addition to an environmental component, basic nutrition education to increase the moderate levels of healthy food knowledge in this population would be important. As demonstrated by the present study, strategies beyond knowledge transfer are essential in this setting, including hands-on activities such as meal planning, cooking classes and in-shop cooking demonstrations that train community members in healthy dietary behaviours and give them the opportunity to practice and build these skills to increase healthy food self-efficacy. For example, cooking classes could show community members how to prepare healthier bannock by adjusting the recipe to include dried fruits and using a preparation method that does not add fat, such as baking without adding fat instead of frying in oil. Such activities have the potential to dramatically increase intentions to consume a healthy diet and improve diet-related

behaviours, thereby reducing risk factors for chronic disease. Another promising method used by programmes to increase participants' intentions and effectively change dietary and physical activity behaviours in other populations is goal setting, in which nutrition educators help participants set specific, measureable objectives to achieve behaviour change (Shilts *et al.*, 2004).

The present study has also highlighted groups within this population most in need of nutrition intervention, such as participants who are younger and have lower levels of education. Notably, the socioeconomic indicators (MSL, employment and income support) were not associated with healthier dietary behaviours, which is in contrast to the findings of studies in other populations (Drewnowski & Darmon, 2005; Damman *et al.*, 2008) This contradiction may indicate the difficulty in making healthy food choices in this setting as a result of environmental constraints, despite possessing the economic resources to do so, and warrants further study.

There are several limitations in the present study. Because the study targeted the main food shoppers and 'preparers' in the household, the majority of the respondents were female, which limits the generalisability to men in the communities. The generalisability of the results to other Inuvialuit communities is also limited. The moderate response rates may indicate the presence of nonresponse bias. In addition, the models for predicting the knowledge, self-efficacy, intention and behavioural constructs accounted for a modest amount of the variance, which is consistent with the literature (Backman *et al.*, 2002; Robinson & Smith, 2002; Gittelsohn *et al.*, 2006; Ho *et al.*, 2008b). Dietary behaviours are shaped by many complex factors, including environmental constraints on food acquisition in this setting, that may not have been accounted for in the present study. Nonetheless, the present study emphasises key factors that can be modified by nutrition intervention programmes to improve health outcomes amongst Inuvialuit. Because the data cannot be used to make assumptions about dietary intake for this population, further research into the associations between these constructs and dietary intake is warranted.

In conclusion, the health of Inuvialuit populations of the western Canadian Arctic is being threatened by lifestyle transition. To reduce risk of obesity and chronic disease amongst this high-risk population, nutrition interventions must address the unique factors that impact their diet. The present study has identified the importance of healthy food intentions, as well as food knowledge and self-efficacy, which impact dietary behaviours in the Inuvialuit population. These should be targeted by nutrition interventions employing behaviour change strategies.

Conflict of interests, sources of funding and authorship

The authors declare 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 Northwest Territories and Nunavut Public Health Association. SS developed the conception and design of the study, and JG assisted in development of the data collection instrument. EDR oversaw the data collection and all field activities. EM and JG contributed to data analysis. All authors were responsible for data interpretation, and EM drafted the manuscript. All authors critically reviewed its content and have approved the final version submitted for publication.

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