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ORIGINAL ARTICLE

TRADITIONAL FOOD ATTRIBUTES MUST BE INCLUDED IN STUDIES OF FOOD SECURITY IN THE CANADIAN ARCTIC

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ABSTRACT

Objectives. The objective was to explore some typically understudied characteristics of food security in Arctic Canada: observed changes to traditional food systems, perceived advantages and health benefits of traditional food and traditional food preferences.

Study design. Data analysis used a cross-sectional survey of Yukon First Nations, Dene/Métis and Inuit women in 44 Arctic communities.

Methods. Open-ended responses to 4 questions were used to qualitatively investigate roles traditional foods play in Arctic food security. Chi-square tests were applied to responses to ascertain differences by age and region. A fifth question explored agreement with cultural responses to harvesting and using traditional food.

Results. Traditional food was regarded as natural and fresh, tasty, healthy and nutritious, inexpensive, and socially and culturally beneficial. Between 10% and 38% of participants noticed recent changes in the quality or health of traditional food species, with physical changes and decreasing availability being reported most often. Caribou, moose and seal were among the foods considered particularly healthy and held special values in these populations. The opinion that all traditional food was healthy was also popular. More than 85% of participants agreed with most cultural attributes of traditional food.

Conclusions. This study confirms that traditional food remains important to Arctic indigenous women and that food security in the Arctic is contingent upon access to these foods.

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Keywords: indigenous peoples, traditional food, food security, Arctic Canada

INTRODUCTION

Comprehensive definitions of food security that include physical and economic access, food safety, nutrition, sufficiency of food and food preferences are theoretically applied to most food security studies in Canada. Dietitians of Canada maintains that “community food security exists when all community residents obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance, and equal access for everyone” (1). Food insecurities have been identified among Arctic indigenous peoples based on measures such as food affordability and dietary intakes (2,3). However, foods considered safe, personally acceptable and healthy require further exploration, especially for indigenous peoples who depend on a food system comprised in whole, or in part, of traditional food sources (4).

Traditional food changes and food security

Global industrialization, especially in the latter half of this century, has catalyzed significant change in Arctic food systems. Contaminant products and by-products of such “modernization” are recognized in the Arctic, far from where most pollution problems originate (5), and are accumulating in the plants and animals that have nourished indigenous peoples for generations (5–9). The rate of climate change has increased in correspondence with amplified production of pollutants. Climate change, which has a pronounced effect in northern latitudes, may disrupt the ways that Arctic people live and interact with their environment (10–12). For instance, global

warming has been shown to negatively affect the forage that directly supports the health and survival of caribou populations (10). It appears probable, therefore, that climate change harm caribou populations and interrupt the possibility of harvesting this important traditional food. Locally produced pollution, a relatively new problem associated with population settlement, also raises concern in indigenous communities. For example, Inuit interviewees who participated in a qualitative study avoided harvesting a traditional food if it inhabited polluted waters, lived too close to town or ate from contaminated sites such as garbage dumps (13). Contemporary problems of long-range contamination, considerable climate change and locally created pollution are affecting Arctic traditional food systems, but the extent to which these changes are being noticed by indigenous peoples is not fully documented, although responses of Inuit as noted above indicate they are becoming increasingly aware of impending problems.

Guidelines for safe levels of exposure to toxins may be exceeded through consumption of large amounts of traditional foods with low levels of contaminants or smaller doses of species with high contaminant burdens. Even with conservative safety guidelines and well-documented benefits of traditional food intake (14), health risks are difficult to determine because most traditional foods do not undergo testing for contaminants. Unfortunately, even when actual risk may be negligible, perceived risk may impede some indigenous peoples from consuming the amounts or types of traditional foods they prefer (15). Food security is jeopardized regardless of whether the risks to food safety are known or are perceived as significant.

Perceived advantages and healthfulness of traditional food in the context of food security

It is well recognized that access to healthy food is a prerequisite of food security (16). But what is healthy food? The term is subjective and depends on many things, including personal and cultural philosophies. It is necessary to identify the foods that characterize health within these particular contexts so that food security needs can be appropriately met. Intrinsic descriptions of food advantages offer insight into the types of food considered important to meeting dietary needs for an active, healthy life. An Arctic-wide exploration of the benefits of traditional food systems as understood by indigenous women will lead to an understanding of food security that is locally and culturally defined (17).

Traditional food preferences and food security

Food preferences form an important part of cultural heritage (18). Not only is access to preferred food culturally important, but it is also a fundamental part of food security. Current food security research in Arctic Canada tends to concentrate on quantitative measures such as food cost and quantity and adequacy of dietary intakes. Because of their significance, issues of personal and cultural food preferences require more attention.

The purpose of this work is to gain insight into these Arctic food security issues that largely remain undocumented: local observations about changes in traditional food systems, perceived advantages and health benefits and traditional food preferences. Intrinsic descriptions of these components of food security enable an appropriate application of the definition of food security within these cultural

contexts. This paper concentrates on traditional food because it is under-represented in Canada-wide food security studies (3,19) and because of its continued importance in the diets and lives of Arctic indigenous peoples (20).

MATERIAL AND METHODS

Three cross-sectional studies aiming to define risks and benefits of indigenous peoples' food systems in Arctic Canadian communities were carried out by researchers from the Centre for Indigenous Peoples' Nutrition and Environment (CINE) between 1993 and 2000. This analysis is based on data from these studies. Data collection methods have been described in detail elsewhere (21–24) and are summarized here.

Research planning and preparation

Research was conducted at the request of 4 Aboriginal organizations: Dene Nation, Métis Nation Northwest Territories, Council of Yukon First Nations and Inuit Tapiriit Kanatami. Representatives from Dene/Métis, Yukon First Nations and Inuit communities chose participating communities based on issues such as local food diversity, health concerns and community size. Forty-four communities were selected. Research agreements were negotiated with each community, all interviewees provided written consent and approval was obtained from the Committee on Human Research Ethics at McGill University. Questionnaires were developed in partnership with community leaders and representatives in each of the regional survey areas. They were pilot tested by CINE researchers and judged acceptable to represent community perspectives.

Participant recruitment and data collection

Radio announcements and flyers posted in public places were used to raise awareness of the research in each community. Band, community or hamlet membership lists were used to identify potential participants. Ten percent of each community or 25 households, whichever was larger, was randomly sampled. Trained, local personnel collected data in participants' homes. Participation rates of contacted households in the 3 regions were excellent (90%, 91% and 75%).

Participants

Both men and women were interviewed but only data from adult indigenous women (20 years or older) are presented here because women are known to be at higher risk of food insecurity (25,26). A total of 1,711 women were included: 422 Yukon First Nations, 511 Dene/Métis and 838 Inuit. Among Dene/Métis, some interview questions were asked only during a seasonal subset ($n=176$). In all age groups, more than half of the households housed 3 or more adults. Number of children in the homes varied significantly across age group and region, with younger participants and Inuit households having the highest number of children and older participants and Yukon households having the fewest (data not shown). Full-time employment status of household members did not vary significantly according to region (data not shown); 57.6–66.1% of younger participants (≤ 60 years) had one or more household member with full-time employment. This percentage was lower for participants ≥ 61 years in all 3 cultural regions.

Data analysis

Using inductive reasoning, 4 open-ended questions were explored and selected for analysis

because responses contained several observations and patterns related to food security. The questions were: "What do you think are the most important advantages of traditional food?" "Have you noticed any recent changes in the quality or health of traditional plants or meats of land animals, birds or fish?" "Is there any traditional food that you think is especially good for health?" and "What are your favourite traditional foods?" In a separate section of the interview, respondents were asked to agree or disagree with or have no opinion about traditional food attributes. The list of attributes was created by a group of Dene chiefs and leaders, and reaffirmed by Yukon First Nations and Inuit community leaders. Earlier reports gave results for all adults (16,21–23); this report is just for women's responses. For analytical purposes, participants were categorized by age (20–40, 41–60 and >60 years old) and region (Yukon, Dene/Métis and Inuit). The first author coded the responses to open-ended questions and a peer reviewer examined the categories, along with the raw data, to offer an alternative perspective regarding classification of data. Chi-square tests were applied to participants' answers to ascertain the distribution of subject responses by age and region. It is important to note that some questions were not analysed by region. For example, favourite traditional foods were not analysed across regions because availability of plant and animal species varies regionally. Analyses were completed using version 6 of Epi Info with $p \leq 0.05$ indicating statistical significance. For purposes of this paper, analyses pertaining to participants' first responses to the first 4 questions are reported. Percentage responses by region for the series of cultural responses to the fifth question were not tested.

RESULTS

Question 1. “What do you think are the most important advantages of traditional food?”

Table I displays women’s responses to this question by age within region. Overall, physical and nutritional well-being was the most popular advantage of traditional food cited by participants. Statements such as “*traditional food is healthy*,” “*[traditional food has] more iron*” and “*[traditional food] makes your blood strong*” were common in all age and regional groups. The proportion of Dene/Métis women who mentioned the advantage of affordability significantly decreased with age ($p<0.001$). Other responses either did not differ across age group or insufficient response rates prohibited analyses. The proportion of Yukon First Nations who identified physical and nutritional well-being as the main benefit of traditional food increased with age ($p<0.05$). A similar trend was observed regarding sociocultural benefits ($p<0.01$). Remarks such as “*keeps our tradition*,” “*brings people together*” and “*involves family in food preparation*” highlight the sociocultural significance of traditional food. Other responses did not differ by age. Inuit women participants between the ages of 41 and 60 reported the benefit of freshness significantly more than the other two age groups ($p<0.05$). There was also a significant, age-related difference in terms of non-responses and non-comments ($p<0.05$). No other significant associations between age groups were found.

When responses of 20–40-year-old women from across the 3 regions were compared (Table II), many significant differences appeared. Affordability of traditional food was the most popular advantage cited by these

young Dene/Métis women; it was considered “*affordable*,” “*cheap*” or “*free*.” Similarly aged Yukon women were most likely to value the purity and natural characteristics of traditional food ($p<0.001$), reporting such benefits as “*no chemicals*,” “*no steroids*,” “*no preservatives*” and “*natural*.” Physical and nutritional well-being topped the list for Inuit ($p<0.001$). Inuit were most likely to not report the main advantage of traditional food or to not comment ($p>0.001$), and were most likely to mention “*other*” advantages of traditional foods ($p<0.01$) like “*availability*” and being able to “*prepare it many ways*.” Taste of traditional food was appreciated in all regions but to different degrees ($p<0.001$). For the youngest age group, there was similarity across all regions concerning the sociocultural benefits and freshness of traditional food.

Like the 20–40 year-olds, 41–60-year-old women from all regions appreciated the sociocultural benefits uniformly. Physical and nutritional well-being was the most prevalent answer for all women in this age category. Yukon First Nations women referred to traditional food as being natural and pure significantly more than the other cultural groups ($p<0.001$). Inuit participants were least likely to associate the main advantage of traditional food with it being inexpensive ($p<0.05$) but most likely to cite nutritional and physical well-being as the main advantage ($p<0.05$). Other responses for this age group did not differ significantly by region or could not be analysed.

Within the eldest age category (61+ years), the most popular response given in all regions was that traditional food was beneficial because of its contribution to physical health and nutritional well-being.

Table I. Percent of women's responses, by age within region, to the question, "What do you think are the most important advantages of traditional food?"

	Dene/Métis		Yukon First Nations				Inuit	
	20–40 yrs (n=196)	41–60 yrs (n=83)	61+ yrs (n=49)	p	20–40 yrs (n=253)	41–60 yrs (n=102)	61+ yrs (n=67)	p
Physical and nutritional well-being	24.0	27.7	34.7	0.303	20.2	25.5	35.8	0.026
Inexpensive	36.7	18.1	12.2	<0.001	18.2	18.6	6.0	n/a*
Taste	2.5	2.4	10.2	n/a	15.8	11.8	10.4	0.403
Fresh	4.6	4.8	2.0	n/a	5.1	3.9	9.0	n/a
Natural/pure	5.1	7.2	0.0	n/a	24.1	17.6	13.4	0.106
Sociocultural benefits	5.1	9.6	14.3	0.069	5.9	7.8	19.4	0.002
Other	15.8	15.7	18.4	0.901	7.9	12.7	3.0	n/a
Don't know/no comment	6.1	14.4	8.2	n/a	2.8	2.0	3.0	n/a
Total	99.9	99.9	100		100	99.9	100	

*n/a = insufficient data within cells for analysis.

Table II. Percent of women's responses, by age across regions, to the question, "What do you think are the most important advantages of traditional food?"

	20–40 yrs		41–60 yrs				61+ yrs	
	Dene/Métis (n=196)	Yukon First Nations (n=253)	Inuit (n=501)	p	Dene/Métis (n=83)	Yukon First Nations (n=102)	Inuit (n=245)	p
Physical and nutritional well-being	24.0	20.2	41.3	<0.001	27.7	25.5	38.8	0.027
Inexpensive	36.7	18.2	9.8	<0.001	18.1	18.6	9.4	0.024
Taste	2.5	15.8	10.0	<0.001	2.4	11.8	9.8	n/a
Fresh	4.6	5.1	5.4	0.912	4.8	3.9	10.2	n/a
Natural/pure	5.1	24.1	2.6	<0.001	7.2	17.6	3.7	<0.001
Sociocultural benefits	5.1	5.9	4.2	0.292	9.6	7.8	6.9	0.725
Other	15.8	8.7	18.2	0.003	15.7	13.7	18.0	0.610
Don't know/no comment	6.1	2.8	8.6	0.009	14.4	2.0	3.3	n/a
Total	99.9	100	100.1		99.9	100	100.1	

* n/a = insufficient data in cells for analysis.

Question 2. “Have you noticed any recent changes in the quality or health of traditional plants or meats of land animals, birds or fish?” Please explain.

Between 10% and 38% of participants noticed recent changes in the quality or health of traditional food species (data not shown). There were no age-related differences among Dene/Métis or Yukon groups but older Inuit noticed more changes in the quality/health of traditional food species than did younger Inuit ($p<0.001$).

In terms of the particular changes noticed, 10% to 27% of participants responded (data not shown). The most common responses included: physical deformities (i.e., “*fish scales look funny*,” “*caribou liver and lungs stuck to ribs*”); decreased accessibility (i.e., “*less animals*,” “*they are getting scarce*,” “*getting less every year, moose, porcupine*”); contamination of traditional food (“*animals sicker because of contaminants*,” “*some mussels can’t be picked due to sewage*”); reduced animal size (i.e., “*individual fish are smaller in size*”); and taste and other sensory changes (i.e., “*fish flesh is not as firm as it used to be*,” “*fish don’t taste the same*”).

Question 3. “Is there any traditional food that you think is especially good for health?”

Among the top 5 traditional foods considered especially healthy by Dene/Métis women were caribou, fish, moose and meat (Table III). The perception that all traditional food was good for health was also prominent in this region. There was a significant age-related difference for those Dene/Métis who indicated that all traditional food is good for health ($p<0.05$), with more women in the upper age groups stating that all traditional food was healthy. No age-related

differences were reported for health benefits of caribou, fish or moose.

The feeling among Yukon participants that all traditional food is healthy increased with age ($p<0.001$) whereas the perception that moose is especially good for health decreased with age ($p<0.01$). Fish, meat and plants comprised the top 5 answers but low frequencies in some age categories prevented statistical analysis across age.

When Inuit participants were asked about traditional food they thought was especially good for health, caribou, seal and fish were the most popular responses. Many participants stated that all traditional food was good for health while some did not know which traditional foods were especially healthy. Interestingly, there was an inverse relationship between age and the impression that caribou is especially good for health ($p<0.01$). Age-related differences were not seen in other responses.

Many women offered explanations as to why they felt certain foods were good for health. While all responses are not shown, the following quotations demonstrate the variety of articulate reasons women felt traditional foods were healthy: “*Fish is good for cholesterol*”; “*Moose meat makes you strong*”; “*Caribou meat – low fat, no chemicals*”; “*All traditional food is good for health*”; “*All are good – I feel safe due to no chemicals*”; “*Moose and fish have lots of protein*”; “*Fish, moose, meat, rabbit open up your appetite*”; “*Caribou. Keeps you strong and kids like it too.*”

Question 4. “What are your favourite traditional foods?”

Among Dene/Métis participants, caribou, moose, whitefish and rabbit were of the most liked traditional foods. Many women also

said they liked all traditional foods. In this region, favourite traditional food was not age-dependent (data not shown).

Within the Yukon First Nations group, caribou, moose, rabbit and salmon were among the favourites. Up to 9% of Yukon women indicated that they enjoyed all traditional food. Most categories were too small to analyse across age groups; however, all age groups liked moose equally.

Caribou, arctic char, other fish (not including char), partridge and seal were the most popular traditional Inuit foods. Preference for caribou decreased with age ($p < 0.001$). The older two age groups identified seal as a favourite food significantly more often than the youngest age group ($p < 0.01$). Partridge was liked equally by all ages.

Question 5. Harvesting and traditional food use.

Table IV shows the percentage of women who agreed with the noted attributes related to traditional food in the 3 regions. More than 85% agreed that harvesting and using traditional food increases physical fitness/health, is a favourite outdoor recreation, provides healthy food, keeps people "in tune with" nature, increases a sense of sharing, saves money, is an essential part of the culture, gives responsibility to children, brings respect, builds pride and confidence, provides education on natural environment, builds survival skills and food preparation skills and teaches patience. In addition, 57–74% agreed that using or harvesting traditional food contributed to humbleness.

Table III. Top 5† answers, by region, to the question "Is there any traditional food that you think is especially good for health?" (% of n women who mentioned food item).

Food Item	20–40 yrs	41–60 yrs	61+ yrs	
Dene/Métis	n=280	n=136	n=95	p
Caribou	20.7	15.4	14.7	0.266
Fish	13.2	7.4	6.3	0.066
Moose	9.3	7.4	10.5	0.688
Meat	5.7	5.1	3.2	n/a
All traditional food	17.5	29.4	27.4	0.011
Total	66.4	64.7	62.1	
Yukon	n=253	n=102	n=67	p
Fish	10.3	4.9	3.0	n/a
Moose	26.4	15.7	10.4	0.001*
Plants	3.2	4.9	0.0	n/a
Meat	4.0	3.9	3.0	n/a
All traditional food	26.5	32.4	59.7	<0.001*
Total	70.4	61.8	76.1	
Inuit	n=501	n=245	n=92	p
Caribou	46.7	38.0	27.2	0.001*
Fish	5.2	9.4	8.7	0.076
Seal	22.8	27.8	26.1	0.310
All traditional food	6.8	6.1	12.0	0.158
Don't know	7.0	4.5	9.8	0.181
Total	88.5	85.8	83.8	

†Individuals may have listed more than 1 item.

Table IV. Percentage agreement by women on selected attributes of traditional foods, by region.

Harvesting and using traditional food by the family	Dene/ Métis (n=176)	Yukon First Nations (n=422)	Inuit (n=838)
	%	%	%
Contributes to physical fitness and good health	91	94	97
Is a favourite outdoor recreation activity	91	87	90
Provides people with healthy food	97	96	98
Keeps people "in tune with" nature	96	95	94
Favours sharing in the community	95	89	95
Saves money	94	94	92
Is an essential part of the culture here	93	95	97
Is an occasion for adults to display responsibility for their children	91	91	95
Contributes to being humble*	57	72	74
Brings respect from others	91	88	88
Builds one's pride and confidence	91	93	90
Provides education on natural environment	94	96	93
Contributes to children's education	95	97	95
Provides skills in survival	97	98	97
Provides skills in food preparation at home	94	98	97
Is an opportunity to learn patience and other personality qualities	91	95	91

*Hunting/using traditional food may contribute to humbleness by reminding indigenous peoples of their place in nature. One's relationship with nature is an integral part of indigenous culture.

DISCUSSION

Perceptions of changes in traditional foods

Most women had not noticed recent changes in the quality or health of traditional food species, while 38.2% did notice. In this case, the low detection of change was encouraging, considering an overwhelming number of observations noted in this research were negative in nature and did not lean in the direction of improved food security. Physical differences in the animals and decreased accessibility were the main changes reported. Although reported in relatively low frequency, these negative changes may inhibit people from eating some traditional foods they desire.

Similar changes were mentioned by Inuit and documented by Poirier and Brooks (13).

Advantages of traditional food

Previous research in these regions has shown overwhelming relationships between traditional foods and sociocultural benefits (27); however, when questions about traditional food were asked in an open format, as done here, physical/nutritional well-being was the most frequent answer. Appreciation of traditional food characteristics such as taste, health and nutritional value have been documented in other Arctic studies (28–30), as was the case in this research. Respondents identified many distinct advantages of traditional food,

with a high level of consensus emerging across all 3 cultural regions. Women valued the fresh, pure, natural state of the food and thought it was an affordable, tasty option. Traditional food was felt to offer physical and nutritional health advantages as well as social and cultural value — all essential elements of holistic health. These research findings suggest that holistic health cannot be achieved outside an environment of food security and food security cannot be achieved in the Canadian Arctic without traditional food.

While similar themes emerged across all regions and age groups, numerous differences were also identified. Differences in perceptions of food benefits imply that food security is experienced differently, and thus may be defined differently in various locations and among various age groups.

Traditional food and health

These data confirm previous findings (14,15,30) that Arctic indigenous women associate traditional food with health. The sentiment that all traditional food is healthy was among the top 5 responses in all regions, signifying an Arctic-wide appreciation of the health benefits of traditional food in general. Fish was also a popular response in all regions, likely because it (unlike some other traditional food species) can be harvested across the Arctic. This research demonstrates universal perspectives that traditional food has many meaningful attributes that contribute to health and cultural life of Arctic indigenous peoples.

Favourite traditional food

Nakano, in 2004, showed that 79% of Yukon and Dene/Métis women preferred traditional food over store-bought meat (15). These results confirm that traditional food is very important to Arctic indigenous women and provide further information regarding the types of traditional food that are preferred. Participants liked many parts of traditional food species prepared in a variety of ways (data not shown). The data also indicate that one or two traditional foods hold special importance in each region. For example, caribou and moose represented >60% of the responses offered by Dene/Métis participants regarding preferred traditional food. Moose and caribou are undoubtedly the favourite traditional food of First Nations and Inuit women, respectively. Food preferences of a small Inuit population in Labrador were published in 1980–1981 (18) and results were similar to those found here. Identifying food preferences in the Arctic can support and direct conservation efforts designed to protect traditional food resources in this region of high food insecurity. Furthermore, identifying favourite foods facilitates an understanding of food security that incorporates cultural meaning.

Conclusions

Arctic indigenous women enjoy eating traditional food and believe in its health-giving properties despite some concern regarding the changing quality of some of these foods.

This study has shown that traditional food remains very important to Arctic indigenous women. Therefore, food security in the Arctic is contingent upon access to these foods. Dietitians of Canada encourage those concerned about this issue “to advocate individually and through participation in coalitions for the development and implementation of policies and programs that support community food security.” Significant advocacy efforts, as well as policy and program development in multiple sectors, should be directed at promoting and protecting traditional food to reduce food insecurities in the Arctic.

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