Canadian Journal of Rural Medicine
CJRM CMR
Journal canadien de la médecine rurale

Original Article
Article original

Understanding healthy pregnancies: the perspective of Inuit midwives in northwestern Quebec

Mary Ellen Macdonald, PhD
Faculty of Dentistry, McGill University, Montréal, Que.

Laakkuluk Williamson Bathory, BSc
Division of Social and Transcultural Psychiatry, McGill University, Montréal, Que.

Hannah Shenker, MD
Department of Family Medicine, McGill University, Montréal, Que.

Hope Weiler, RD, PhD
School of Dietetics and Human Nutrition, McGill University, Ste-Anne-de-Bellevue, Que.

Margaret Berry, MD, MSc, FRCP(C)
Northern and Native Child Health Program; Department of Pediatrics, McGill University, Montréal, Que.

Atul Sharma, MD, MSc, FRCP(C)
Celia Rodd, MD, MSc, FRCP(C)
Department of Pediatrics, McGill University, Montréal, Que.

Correspondence to: Celia Rodd; crodd@hsc.mb.ca

This article has been peer reviewed.

Introduction: For 25 years, Inuit midwives have provided perinatal and newborn care for about 90% of the pregnancies in northwestern Quebec. Patients in this region continue to have high rates of preventable nutritional deficiencies. The objective of this study was to explore the perceptions of professional midwives and students about what makes a healthy pregnancy and a healthy newborn.
Methods: We convened, via teleconference, a semistructured focus group with the local midwives and students. The conversation focused on local understanding of a healthy pregnancy and a healthy newborn, and the role of midwives in the communities.
Results: Four midwives and 6 students took part in the focus group, representing 80% of local midwives and students. All of the participants were women, and their professional experience ranged from 3 to 25 years. Through inductive thematic analysis, it became apparent that personal experiences and professional training were important determinants of opinions. Midwives believed that the health of women and infants could be improved through better food selection, particularly reliance on traditional nutrient-rich food. They were aware that iron deficiency was a problem and that infants required vitamin D; however, they reported that supplement uptake was poor.
Conclusion: Concern was expressed about a decline in traditional beliefs and about unhealthy behaviours. Participants advanced strategies to promote knowledge locally (e.g., visual aids, local radio) to attempt to reduce rates of nutritional deficiencies.

Introduction : Pendant 25 ans, les sages-femmes inuites ont prodigué les soins périnataux et néonataux requis pour environ 90 % des grossesses dans le Nord-Ouest du Québec. Les patientes de cette région continuent de présenter des taux élevés de carences nutritionnelles évitables. L'objectif de cette étude était d'explorer les perceptions des sages-femmes professionnelles et des étudiantes sur ce qu'elles considèrent comme une grossesse saine et un nouveau-né en bonne santé.
Méthodes : Nous avons organisé un groupe de discussion semi-structuré par téléconférence avec des sages-femmes et des étudiantes locales. L'entrevue a porté sur leur conception d'une grossesse saine et d'un nouveau-né en bonne santé et sur le rôle des sages-femmes dans les communautés.
Résultats : Quatre sages-femmes et 6 étudiantes ont participé au groupe de discussion, représentant 80 % des sages-femmes et étudiantes locales. Toutes les participantes étaient des femmes et leur expérience professionnelle variait de 3 à 25 ans. Une analyse thématique inductive a fait ressortir que les expériences personnelles et la formation professionnelle étaient d'importants déterminants des opinions formulées. Les sages-femmes se sont dites d'avis que la santé des femmes et des nouveau-nés pouvait être améliorée par de meilleurs choix alimentaires, particulièrement en ce qui concerne l'alimentation traditionnelle, riche en éléments nutritifs. Elles étaient conscientes du fait qu'une carence en fer constitue un problème et que les nourrissons ont besoin de vitamine D. Elles ont toutefois mentionné que dans les faits, les suppléments sont peu utilisés.
Conclusion : Les participantes ont exprimé leur inquiétude face au déclin des connaissances traditionnelles et face aux comportements malsains. Elles ont proposé des stratégies pour promouvoir la transmission des connaissances à l'échelle locale (p. ex., aides visuelles, radio locale) pour tenter de remédier aux carences nutritionnelles.

INTRODUCTION

Midwives of western Nunavik in northern Quebec provide local care for expectant mothers and infants for the first 2 months of life.[1,2] More than 90% of the approximately 200 births each year occur at 3 regional birthing centres. Before the 1980s, Inuit women were generally transferred late in their third trimester to give birth in a large urban tertiary care hospital in southern Quebec. Inuit women mobilized in the 1980s to reclaim their traditional practices and to ensure safe, competent birthing care in their own communities.[1,2]

The Inuulitsivik Midwifery Education Program is a modular, competency-based curriculum that is consistent with midwifery education programs in southern Canada. Storytelling and other local methods of teaching (e.g., showing rather than telling) are the cornerstone for learning in this program, which is dedicated to preserving and promoting Inuit-based practices. Emphasis is placed on the transfer of traditional knowledge, for example how to promote healthy pregnancies via a diet of traditional or "country" foods.[1,2] The students typically spend about 4–5 years to complete the program, although their training is often intermittent when they have maternity leave for their own infants.

Consistently, more than half of the midwives in Inuulitsivik are Inuit, selected for training by the community and trained there; the rest of the midwives are non-Inuit and come from southern communities. Together, this group has developed practice guidelines for the care of pregnant mothers and infants. While working in 3 communities spread across about 1700 km of Arctic coastline, these midwives participate in weekly teleconferences to discuss ongoing pregnancies and share their knowledge.[1] Perinatal mortality in these communities is consistent with the overall rate in Canada and the rates in regions populated largely by Inuit communities.[1]

Notwithstanding the successes of the Inuulitsivik Midwifery Education Program, mothers and infants in northwestern Quebec still have higher rates of several preventable nutritional deficiencies compared with national averages.[3–7] Infants born in northern Canada have a 4–5 times higher incidence of severe vitamin D deficiency (rickets) than infants born in southern Canada.[3–5,8] As a preventive strategy, 400 IU/day of vitamin D is recommended for infants living north of 55° latitude if breastfed during summer months, and higher doses are suggested during winter months (October to April) when infants cannot generate vitamin D through cutaneous sun exposure.[9]

Reasons for these deficiencies include reduced intakes of nutrient-rich traditional foods, the scarcity and high cost of healthy food options in local grocery stores, and the lack of enthusiasm for following supplementation guidelines provided by midwives and other health care providers.[10–12] Poor uptake of supplements is a worldwide issue, reflecting skepticism toward supplementation (e.g., especially when there are no outward signs of poor health), as well as lack of knowledge, lack of support from health care providers, and a common belief that the current diet provides complete nourishment.[13,14]

In this study, we sought to explore the perceptions of professional midwives and students as key providers of perinatal care in Inuulitsivik about what makes a healthy pregnancy and a healthy newborn. We also sought to explore community perceptions about perinatal and newborn health, and to determine local attitudes about nutritional supplements. With the use of focus groups, we sought to understand attitudes, knowledge, perceptions and beliefs of the midwives about barriers to infant vitamin D supplementation and rickets prevention in this region, while exploring culturally acceptable strategies for future interventions.

METHODS

Participants

Participants were Inuit midwives and students working in 3 birthing centres in western Nunavik. We excluded non-Inuit midwives in an attempt to capture the thoughts and beliefs of the local women, without any influence or bias from their supervisors or colleagues. The moderator of the focus group (L.W.B.) is an Inuk mother.

Data collection and analysis

In June 2011, we conducted a semistructured focus group, which lasted about 2 hours. The discussion focused on local understanding of a healthy pregnancy and a healthy newborn, and the role of midwives in the communities. The conversation was in English with occasional Inuktitut phrases, which were translated by the moderator. The session was conducted via teleconference and was audiotaped. The moderator transcribed the recording shortly afterwards, using standard rules of transcription. All identifiers were removed from the transcript, which was reviewed by the moderator and by the

principal investigator (C.R.). The principal investigator was present during the phone conversation only as a listener. Additional focus groups were not deemed necessary, because the research team felt that the first one had been sufficiently thorough.

A deductive and inductive thematic analysis was used to analyze the transcript. The deductive coding frame was constructed from the interview guide; the inductive coding frame was developed through multiple careful readings of the transcripts by the moderator, the principal investigator and the co–principal investigator (M.E.M.). As recurring ideas were identified, the 3 investigators used consensus to develop the major themes and subthemes. Exemplar quotations were then extracted from the transcript by C.R.[15,16]

Ethics approval

The study received ethics approval from the Montreal Children's Hospital Research Ethics Board and the Inuulitsivik Health Board.

RESULTS

Four midwives and 6 midwifery students participated in the focus group. The sample represented more than 80% of the midwives and students from the birthing centres. All of the participants were women, and their professional experience ranged from 3 to 25 years.

The midwives had much to say about pregnancies, nutrition, supplementation and health practices. One experienced midwife was particularly passionate about the topics, frequently articulating ideas that resonated with all other participants. This sharing had a didactic component, which was consistent with the experiential learning style of their midwifery curriculum. Cued by the moderator, all participants were able to provide important insights from their own pregnancies, their training and their work.

Three major themes formed our deductive analytic framework: local understanding of a healthy pregnancy, local understanding of a healthy infant and the role of midwifery today.

Local understanding of a healthy pregnancy

When speaking about the determinants of a healthy pregnancy, 3 major topics emerged: food selection, unhealthy lifestyle choices and the need to support traditional community values.

The participants spoke passionately about the need for better food selection, especially a greater reliance on traditional nutrient-rich foods. They appropriately perceived these as rich sources of nutrients, such as iron and vitamin D (Table 1). Yet there was a strong feeling that mothers had little appreciation for the value of country foods; some did discuss that access might also be limited. Additionally, one midwife stated that young women were buying "junk" (i.e., commercial) foods instead of nutritious foods, perhaps because healthier choices were often more expensive and perhaps because they also spent money on drugs and alcohol. False advertising in the local store was seen as another barrier. One woman stated, "Crystal powders that they sold at the [grocery store] — I thought that they were good for

Table 1: Traditional foods rich in vitamin D, in English and Inuktitut (Nunavik lexicon)[17]

English	Inuktitut
Good sources of vitamin D (content > 5 µg/100 g)	
Beluga	ᖁᓕᓗᑕᖅ
Blubber, boiled	ᐅᖁᓂᖅ/ᐅᖅᓂᖅ, ᐃᓚᖅ. ᖃᐅᐃᒪᔭᓂᖅ
Oil, aged	ᑲᐅᑕᖅᑕᖅ ᐃᖁᑎᖅ
Narwhal	ᐊᑦᓕᖓᐊᖅ
Blubber, raw	ᐅᖁᓂᖅ/ᐅᖅᓂᖅ, ᑲᐅᑕᖅᑕᖅ ᐃᖁᑎᖅ
Ringed seal	ᓇᖁᓂᖅ
Liver, raw	ᑎᖏᔪᒃ, ᒥᑭᑕᖅ
Arctic char	ᐃᖁᒃᓗᒃ, ᐃᖁᒃᓗᐸᐱᒃ
Flesh, raw	ᓂᖁᑭ, ᒥᑭᑕᖅ
Flesh and skin, dried	ᓂᖁᑭ, ᐊᒥᖁᖅ, ᐅᕆᔨᓂᒃ, ᐱᖁᓂ
Cisco eggs	ᓂᕐᔾᐃᑦ
Raw	ᒥᑭᑕᖅ
Lake trout, raw	ᐃᓂᐅᕆᓪᓚᖅ
Flesh, raw	ᓂᖁᑭ, ᒥᑭᑕᖅ
Loche	ᑎᒃᒋᓪᒃ
Eggs, raw	ᓂᕐᔾᐃᑦ, ᒥᑭᑕᖅ
Liver, raw	ᑎᖏᔪᒃ, ᒥᑭᑕᖅ
Sculpin	ᑲᓇᔨᖅ
Flesh, raw	ᓂᖁᑭ, ᒥᑭᑕᖅ
Bones, raw	ᖁᐅᕆᑦ, ᒥᑭᑕᖅ
Moderate sources of vitamin D (content 0.5–5 µg/100 g)	
Beluga	ᖁᓕᓗᑕᖅ
Maktak, raw	ᒪᒃᑕᖅ, ᒥᑭᑕᖅ
Caribou	ᑐᒃᑐ/ᑐᑦᑐ
Kidney, raw	ᑕᖃᑐᖅ/ᑕᖅᑐᖅ, ᒥᑭᑕᖅ
Liver, raw	ᑎᖏᔪᒃ, ᒥᑭᑕᖅ
Muskox	ᐅᒥᖓᒪᖅ
Fat, raw	ᐅᖁᓂᖅ/ᐅᖅᓂᖅ, ᒥᑭᑕᖅ
Whitefish	ᑲᕆᔨᓕᒃ
Flesh, raw	ᓂᖁᑭ, ᒥᑭᑕᖅ
Bearded seal	ᐅᓴᔪᒃ
Flex, boiled	ᐃᓚᖅ. ᖃᑦᓕᑕᖅ, ᐊᖁᓕᓪᓗᖁᑉ
Arctic cod	ᐃᑕᖅ
Ringed seal	ᓇᖁᓂᖅ
Blubber	ᐅᖁᓂᖅ/ᐅᖅᓂᖅ
Brain	ᖃᑲᓕᑕᖅ
Eyes	ᐃᓱᑦ

my kids because in the advertising they were saying that [they were] 'vitamin C enriched.' I only learned later that they were just colour and sweeteners and that ruined my babies' teeth."

Others noted a risk factor for poor pregnancy and infant outcomes was the lack of acceptance of advice from midwives, particularly in relation to supplements. One midwife stated, "Even though we introduce supplements for them to help them to get their [iron levels] higher, even though we teach them at each prenatal visit ... some are listening and some are not listening." One reason for "not listening" was described as follows: "They think of it as medicine ... some people do not like taking medicine."

When exploring the role of the community and the elders, one participant conveyed that a healthy pregnancy requires multiple components: it "is mind and spirit and taking care of your body and having support from family and being followed by a midwife." Community support was also important: fresh country food was offered first to pregnant women, and hunters and elders understood which foods were nutritionally important for a healthy pregnancy. A senior participant recounted, "This man, having one ptarmigan at home, will call my mother and my mother would say [to me]: 'Look, you need to eat ptarmigan during your pregnancy.'" Ptarmigan, a bird hunted by the Inuit, is "rich in iron" the participant explained. However, this community support may also be in decline. Participants lamented the loss of social traditions from one generation to the next. As one midwife put it, "[traditional] rules to do during your pregnancies [are] not being practised as much as [they were] years ago." Whereas this has now become the job of midwives, a senior midwife also felt that the onus was on community members to do more to promote healthy behaviours.

Thus, there was a clear perception that rapid social changes (especially related to diet and access to affordable healthy foods), lack of education (especially regarding the nutritional value of foods and the importance of supplements) and reduced community involvement challenged efforts to support healthy pregnancies.

Local understanding of a healthy infant

The second deductive topic was the determinants of a healthy infant. Three major themes emerged from the group conversation: the importance of breastfeeding, infant nutrition through local foods and supplements, and the need for more nutritional education in communities and midwife training.

One participant was particularly vocal on the topic of breastfeeding, seeing it as both "the best nutrition, especially during the first year" and "good bonding for the mother and the baby." Despite competing pressures on young mothers to give up breastfeeding to "go out fishing ..., to go out anywhere," she argued that it was the job of the midwife to encourage "young mothers to breastfeed often and much more." While aware of iron deficiency risks, the participants were not as aware of other nutritional deficiencies. When the moderator asked about vitamin D and rickets, a senior participant responded, "Rickets? What is that?" No one had knowingly seen a case of rickets or children with bowed legs or a young infant with hypocalcemic seizures (typical manifestations).

When asked about midwifery teaching on nutritional supplements, it was noted that this was a new part of their practice. One woman understood that infants were particularly vulnerable in the winter months and that twice the usual vitamin D dosage should be given because of the lack of sun. However, the general consensus was that young mothers do not take this advice when it is offered to them, despite the availability of free supplements at local nursing stations. "[Mothers] do not always give vitamin D," she explained. "It is not really on the scene." As for pregnant women, part of this reluctance was again attributed to the frequent association between supplements and medicine, which mothers do not perceive themselves as needing during pregnancy.

Role of midwifery today

It was evident in the focus group that the midwives took pride in their work, knowing they were promoting good health for both mothers and newborns. Although they acknowledged that their work had many challenges, their commitment can perhaps be summed up best through the words of a senior participant who stated that midwives ultimately are "the voice of the unborn."

Here, 3 main subthemes emerged. First, the participants saw it as their role to teach about the nutritional value of traditional foods; they were aware that their training allowed them to better understand nutritional issues, the problems with false advertising and the value of traditional counsel. Yet, they also acknowledged their own limitations.

Second, they were aware that planned pregnancies, especially within respectful partnerships, were the most successful in terms of health outcomes for infant and mother. Yet, they also knew that encouraging forethought in youth was a huge challenge.

Finally, they were aware of the vital importance of a community network to good health outcomes, specifically the intergenerational transfer of traditional knowledge. Like the dynamic observed within the focus group itself, engagement with the senior midwife provided an invaluable opportunity for learning, as younger midwives and students welcomed her experience-based expertise. A plan articulated by the midwives during the focus group involved the use of multimedia (e.g., "pictures on the effect of lack of vitamin D"). Another creative suggestion was the idea of a calendar-type tool to coordinate seasonal access to traditional foods with nutritional requirements.

DISCUSSION

The midwives strongly believed that the health of pregnant women and young children in their communities could be better, through better food choices, acceptance of supplements and rejection of detrimental lifestyle choices (e.g., use of alcohol, cigarettes and drugs). However, the midwives also shared a clear perception that rapid social changes (especially related to diet and access to affordable healthy foods), lack of education, widespread substance abuse and reduced community involvement challenged efforts to support healthy pregnancies.

For example, there is a general perception among the Inuit that traditional foods are healthy, free of cost and nutritious, and that they enhance cultural bonds through sharing.[18,19] But the reality is that many northern Inuit communities are experiencing a shift to blended traditional and store-bought food despite the nutritional deficiencies that result from reduced intake of traditional foods.[20] Changes in local customs, the high cost of fuel for hunting trips coupled with financial hardship, and lack of knowledge of when and what to harvest to ensure well-rounded diets are also reasons for the waning use of traditional food.[20–22] Adding complexity, there are increasing concerns over pollutants in traditional foods and how communities manage the potential benefits and dangers of their consumption.[23] The result is the increasing omission of nutrient-rich food like ptarmigan from the spectrum of healthy food options for expectant mothers.

A recurring theme in the focus group was the lack of confidence and interest in nutritional supplements among expectant mothers. The literature on supplement use across the world notes that some communities prefer natural sources to supplements; others avoid supplements because they are believed to promote fat, which is viewed negatively by women.[14] Among the Inuit specifically, the midwives argue that the frequent association of supplements (taken to enhance health) with medicine (taken in ill health) challenges local efforts to promote healthy pregnancies. To overcome this resistance, the midwives proposed educating the community about the importance of nutritional supplements through a multimedia campaign (e.g., radio advertisements, flyers) targeting mothers.[11] Some other groups have successfully worked on increasing knowledge by targeting stores with information adjacent to the various products.[11]

There is abundant literature that documents the unhealthy lifestyle choices of many Inuit, First Nations and indigenous communities, with higher risks for pregnant women and fetuses.[6,24] These include high rates of smoking, and use of alcohol and marijuana. In a previous survey of several Nunavik and other Canadian Inuit communities, it was demonstrated that rates in pregnant women were 92%, 61% and 35%, respectively.[25] This widespread use of substances is an important barrier to healthy pregnancies. The midwives in our study recognized that this is a major challenge to the health of mothers and infants, and they felt strongly that the best way to make a positive impact in their communities was through further education. Across the globe, the role of education has been connected to the positive community health outcomes, including increased intake of supplements.[26]

We found no studies evaluating gains in midwives' nutritional knowledge after completion of their professional training. The women participating in the focus group were self-selected as interested in community health. Moreover, they were eager to acquire new knowledge and continually improve health outcomes, as evidenced by their interactions during the focus group. It was apparent that the focus group was in itself a learning tool through sharing information and outside knowledge. That the moderator was an Inuk mother likely put them further at ease. Continuing education was eagerly sought by this group, who welcomed more interactive sessions.

Whereas we deliberately sought midwives from northern communities in this study, in future studies we could also include non-Inuit midwives, asking for their perspectives on their work in these communities. Future efforts will ensure that the midwives are provided with educational flyers to post in their nursing stations; we also hope to create additional tools to highlight the seasonal variability of foods rich in vitamin D (Table 1), to help the midwives to promote them better.

Limitations

About 20% of the local Inuit midwives were unable to participate in our focus group. We acknowledge that there were few midwives in these communities to discuss their perceptions, that they were self-selected and that only a single focus group was held. The resulting small sample may limit generalizability and relevance to other health care providers across Canada.

CONCLUSION

The midwives of the Inuulitsivik region expressed concern about unhealthy behaviours in young women and about the decline of traditional beliefs, particularly during pregnancy. They were eager to engage the community and promote knowledge locally to reduce nutritional deficiencies and optimize health during pregnancy and infancy.

Acknowledgements: The authors thank the Inuit midwives and students at the Inuulitsivik Health Centre for participating in this project and the Montreal Children's Hospital Research Institute for funding. The Canada Research Chairs provided a salary award to Hope Weiler. Additionally, the authors thank Michele Therrien and Johanne Morel for translating and validating the English to Inuktitut material, and Carolina Pineda for assistance with the manuscript.

Competing interests: None declared.

REFERENCES

1. Van Wagner V, Eppo B, Nastapoka J, et al. Reclaiming birth, health and community: midwifery in the Inuit villages of Nunavik, Canada. *J Midwifery Womens Health* 2007;52:384-91.
2. Van Wagner V, Osepchook C, Harney E, et al. Remote midwifery in Nunavik, Quebec, Canada: outcomes of perinatal care for the Inuulitsivik Health Centre, 2000-2007. *Birth* 2012;39:230-7.
3. Berti P, Souedia R, Kuhlein M. Dietary assessment of indigenous Canadian Arctic women with a focus on pregnancy and lactation. *Int J Circumpolar Health* 2008;67:349-62.
4. Christofides A, Schauer C, Zlotkin S. Iron deficiency and anemia prevalence and associated etiologic risk factors in First Nations and Inuit communities in northern Ontario and Nunavut. *Can J Public Health* 2005;96:304-7.
5. Plante C, Blanchet C, Rochette L, et al. Prevalence of anemia among Inuit women in Nunavik, Canada. *Int J Circumpolar Health* 2011;70:154-65.
6. Waiters B, Godel J, Basu T. Perinatal vitamin D and calcium status of northern Canadian mothers and their newborn infants. *J Am Coll Nutr* 1999;18:122-6.
7. Willows N, Dewailly E, Gray-Donald K. Anemia and iron status in Inuit infants from northern Quebec. *Can J Public Health* 2000;91:407-10.
8. Ward L, Gaboury I, Ladhani M, et al. Vitamin D deficiency rickets among children in Canada. *CMAJ* 2007;177:161-6.
9. Canadian Pediatric Society. Vitamin D supplementation in northern Native communities. *Paediatr Child Health* 2002;7:459-63.
10. Schaefer S, Erber E, Trzaskos J, et al. Sources of food affect dietary adequancy of Inuit women of childbearing age in Arctic Canada. *J Health Popul Nutr* 2011;29:454-64.
11. Sharma S, Barr A, Macdonald H, et al. Vitamin D deficiency and disease risk among aboriginal Arctic populations. *Nutr Rev* 2011;69:468-78.
12. Muckle G, Boucher O, Laflamme D, et al. *Qanuippitaa? How are we? Nunavik Inuit Health Survey 2004*. Quebec: Institut national de sante publique du Quebec; Nunavik Regional Board of Health and Social Services; 2008.
13. Hill Z, Kirkwood B, Kendall C, et al. Factors that affect the adoption and maintenance of weekly vitamin A supplementation among women in Ghana. *Public Health Nutr* 2007;10:827-33.
14. Wijsmann-Grootendorst A, van Dam R. The attitude of Dutch women of Turkish ancestry towards measures for the prevention and treatment of vitamin D deficiency; the results of focus group interviews. *Ned Tijdschr Geneeskd* 2005;149:932-6.
15. Kreuger R, Casey M. *Focus groups: a practical guide for applied research*. Thousand Oaks (CA): Sage Publications; 2000.
16. Stewart D, Shamdasani P, Rook D. *Focus groups: theory and practice*. Thousand Oaks (CA): Sage Publications; 2007.
17. Kuhnlein H, Barthet V, Farren A, et al. Vitamins A, D and E in Canadian Arctic traditional foods and adult diets. *J Food Compos Anal* 2006;19:495-506.
18. Lambden J, Receveur O, Kuhlein M. Traditional food attributes must be included in studies of food security in the Canadian Arctic. *Int J Circumpolar Health* 2007;66:308-19.
19. Johnson-Down L, Egeland G. Adequate nutrient intakes are associated with traditional food consumption in Nunavut Inuit children aged 3–5 years. *J Nutr* 2010;140:1311-6.
20. Sharma S, Gittelsohn J, Rosol R, et al. Addressing the public health burden caused by the nutrition transition through the Healthy Foods North nutrition and lifestyle intervention program. *J Hum Nutr Diet* 2010;23(Suppl 1):120-7.
21. Beaumier M, Ford J. Food insecurity among Inuit women exacerbated by socioeconomic stresses and climate change. *Can J Public Health* 2010;101:196-201.
22. Mead E, Gittelsohn J, Kratzman M, et al. Impact of the changing food environment on dietary practices of an Inuit population in Arctic Canada. *J Hum Nutr Diet* 2010;23(Suppl 1):18-26.
23. Turgeon O'Brien H, Blanchet R, Gagne D, et al. Exposure to toxic metals and persistent organic pollutants in Inuit children attending childcare centers in Nunavik. *Environ Sci Technol* 2012; 46:4614-23.
24. Schroth R, Lavelle C, Moffat M. Review of vitamin D deficiency during pregnancy: Who is affected? *Int J Circumpolar Health* 2005;64:112-20.
25. Muckle G, Laflamme D, Gagnon J, et al. Alcohol, smoking and drug use among Inuit women of childbearing age during pregnancy and the risk to children. *Alcohol Clin Exp Res* 2011;35:1081-91.
26. Locyer V, Porcellato L, Gee I. Vitamin D deficiency and supplementation: Are we failing to prevent the preventable? *Community Pract* 2011;84:23-6.