Radio drama: a pilot project for nutritional health communication in Inuit communities

Cassandra Anne Matta

School of Dietetics and Human Nutrition
McGill University, Montreal QC

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Dedication

I would like to dedicate this thesis to my mom, Terry Racicot, who has passed to me her passion for learning.

ABSTRACT

Background: A recent youth health survey in Pangnirtung, NU, revealed that youth are consuming an average of 1L soft drinks per day. In an effort to decrease soft drink consumption, while at the same time develop a method of education appropriate for Inuit communities, the education-communication theory Extended Elaboration Likelihood Model (EELM) was utilized to inform a radio drama health intervention in the primarily Inuit community of Pangnirtung, NU. The following study was designed and evaluated using quantitative and qualitative features, thereby utilizing a mixed-methods approach.

Objectives: The primary objectives included: 1) creation of a reproducible radio drama intervention including both youth and Elder voices that adhered to EELM for education communication; and 2) evaluation of the effectiveness of a radio drama intervention based on attitude and behaviour change of soft drink consumption from pre-and post-intervention survey.

Methods: The study utilized a participatory process to develop radio dramas, combining elder and youth voices, with the intent to promote decreased soft drink consumption in Pangnirtung, NU, youth ages 16-25y. The study was comprised of two parts: first, creation of radio dramas aligned with EELM theory and focus group evaluation of the dramas before playing on-air; and second, a radio drama intervention and subsequent evaluation. Radio dramas were created, recorded, and reviewed with the assistance of local youth in Pangnirtung, NU. The radio messages were then tested via evaluation of EELM qualities in two focus groups (n=4, n=5) to determine fulfillment of the optimum conditions of EELM theory. In part two, youth radio dramas were aired for 6 weeks in Fall 2010. Effectiveness of the dramas was assessed by paired pre- and post-intervention surveys (n=34 at pre-survey). Qualitative data were collected

from a community radio call-in show to indicate community acceptance and adoption of program.

Results: Focus group evaluation of the radio drama adherence to EELM was helpful in identifying revisions before the radio dramas were played on-air. Average age of the study population at post-survey (n=30) was 22.2y (SD=3.0). A total of 13 (43%) of youth surveyed had heard the radio dramas. There was significant increase in knowledge gain (the correct answer given) between pre- and post-survey when youth were asked to write the correct Inuttitut word for the concept of 'moderation of food', something explained in an Elder story shared on air (P=0.025). Overall, analysis found that youth who heard the radio dramas consumed 1.3 cans (SE 0.94, P=0.09) less of soft drinks the previous day (in post-survey results) compared to those that did not hear the programming.

Significance: Participatory process was welcomed by the Inuit community and is effective for community health interventions. Youth and the community responded well to radio as a medium for professional health information-exchange. Results from this theory-based, evaluated intervention can help to structure future nutritional health communication initiatives in Inuit communities, an important step in preventative medicine.

RESUME

Contexte: Un sondage récent sur la santé des jeunes à Pangnirtung, au Nunavut, a démontré que les jeunes consomment en moyenne 1 litre de boissons gazeuses par jour. Afin de diminuer la consommation de boissons gazeuses et de développer une méthode éducative adaptée pour les Inuits, nous avons utilisé la théorie «Extended Elaboration Likelihood Model » (EELM) pour réaliser une intervention en santé utilisant une série de capsules radiophoniques élaborées principalement pour la communauté de Pangnirtung, au Nunavut. L'étude qui suit utilise l'approche « mixed methods ».

Objectifs: Les objectifs principaux sont: 1) la création d'une série de capsules radiophoniques reproductibles qui incluent la voix de jeunes et d'aînés ayant utilisé la méthode EELM lors de leur communication, et 2) l'évaluation de l'efficacité d'une intervention radiophonique basée sur les changements de comportement des auditeurs et sur les changements de consommation de boissons à la suite de la diffusion des capsules radiophoniques.

Méthodes: L'étude a utilisé un processus participatif pour développer une série de capsules radiophoniques, en combinant les voix d'aînés et des jeunes âgés entre 16-25 ans dans le but de promouvoir une diminution de la consommation de boissons gazeuses à Pangnirtung. L'étude comprend deux parties: premièrement, la création d'une série de capsules radiophoniques basées sur la théorie EELM et leur évaluation par des groupes de discussion avant leur diffusion, et deuxièmement, l'intervention en tant que telle ainsi que son évaluation subséquente. La série de capsules radiophoniques a été élaborée et révisée avec l'aide de jeunes de Pangnirtung. Les messages radiophoniques ont ensuite été évalués selon les composantes de la théorie EELM par deux groupes de discussion (n = 4, n = 5) afin de confirmer le respect de la théorie. Durant la deuxième partie de l'étude, les capsules radiophoniques faites par les jeunes ont

été diffusées pendant six semaines à l'automne 2010. L'efficacité des capsules a été évaluée en comparant les résultats avant et après leur diffusion (n = 34 pré-enquête). Des données qualitatives ont été recueillies et analysées pour démontrer l'acceptation et l'adhérence au programme par la communauté.

Résultats: L'évaluation des capsules radiophoniques avant leur diffusion par les groupes de discussion en fonction de la théorie EELM a permis d'en identifier les aspects à améliorer. L'âge moyen de la population lors de l'enquête après la diffusion des capsules (n = 30) était de 22,2 ans (écart-type = 3,0). Le sondage a démontré que 13 des jeunes interrogés (43%) avaient entendu les capsules à la radio. Une amélioration importante des connaissances, basée sur la bonne réponse donnée, a été observée avant et après la diffusion des capsules lorsque les jeunes ont identifié par écrit le mot inuttitut associé au concept de la «modération de la nourriture", concept clef tout au cours de la série (P = 0,025). L'analyse a révélé que les jeunes qui avaient entendu les capsules à la radio avaient consommé en moyenne 1,3 canettes (erreur-type = 0,94 ; P = 0,09) de moins que la journée précédente comparés à ceux qui ne les avaient pas entendues.

Importance: Le processus participatif a été bien accueilli par la communauté inuite et est efficace pour les interventions en santé communautaire. Les jeunes et la communauté en son ensemble ont apprécié la radio comme média d'informations sur la santé. Les résultats de cette intervention peuvent contribuer à mieux structurer les communications futures portant sur la nutrition dans les communautés inuites, une étape importante en médecine préventive.

CONTRIBUTION of AUTHOURS

Dr. Egeland, advisor of the candidate, oversaw the development of the project, ethics and funding acquisition, intervention process, data collection and results interpretation.

Dr. Aboud provided guidance on intervention development in respect to using educational theory to guide the project. Dr. Ford assisted with methods for participant recruitment. Drs. Egeland, Aboud and Ford assisted with interpretation of the results and editing of the final thesis.

Members of the Pangnirtung Steering Committee including Markus Wilke advised on project development and execution, as well as translations when required.

Cassandra Racicot-Matta worked to develop the project, manage the intervention and data collection, analyze data, interpret findings and write the thesis manuscript.

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ABBREVIATIONS

AED	Academy for Educational Development
AIDS	acquired immune deficiency syndrome
BMI	body mass index
CDC	Center for Disease Control
CI95%	95 percent confidence interval
CINE	Center for Indigenous Peoples' Nutrition and Environment
CF	country food
DVD	digital versatile disk
ELM	Elaboration Likelihood Model
EELM	Extended Elaboration Likelihood Model
FG	focus group
GEMS-FFFP	Girls health Enrichment Multi-site Studies – The Fun, Food and Fitness Project
HIV	human immunodeficiency virus
IQ	Inuit Qaujimajatuqangit
IR_{HOMA}	insulin resistance index, from the homeostasis model of assessment-insulin resistance (HOMA-IR)
$ISI_{0,120}$	insulin sensitivity index
L	litre
MF	market food
Ml	milliliters
OZ	ounces

RR	relative risk
TF	traditional food
WC	waist circumference
Y	years
%BF	percentage body fat

CHAPTER I: Purpose and Objectives

1.1 Background

A recent youth health survey in Pangnirtung, NU, revealed that youth are consuming an average of 1L soft drinks per day [1]. These results indicate a need for increased health education and policy implementation to protect the health of youth. Currently, it is a struggle to properly convey messages of health and nutrition that are both culturally and contextually appropriate for Indigenous communities. Inuit communities, in particular, are remote and language and cultural differences can hinder health communication. Health promotion that is based upon existing frameworks of knowledge and theory can provide an effective starting point for health education and communication [2-4]. Radio has been identified as an important medium for communication in Inuit communities, used for local and national news as well as music. Radio use for health promotion in Inuit communities is generally unevaluated. However, in an international setting radio drama programming has been found to be successful [5-7]. Research indicates that health promotion rooted in educational theory (when compared to programming that is not) is more likely to be effective and can be more appropriately evaluated [2-4]. The Extended Elaboration Likelihood Model (EELM) caters to entertainment-based health education such as radio, focusing on storyline appeal, unobtrusive persuasive subtext, quality of production, and ability for audience to relate [8, 9]. EELM theory promotes behaviour change by eliciting a central attitude change [10, 11]. Emerging research suggests that entertainment-media education could be a powerful tool in affecting nutritional health behaviour change [3].

1.2 Research Objectives

The purpose of this study was to determine if radio drama based on Elaboration Likelihood Model (ELM) theorem and the use of Elder storytelling and youth dialogue in combination could be an effective nutritional health education tool for Inuit communities.

The primary objectives of this proposed research thesis included: 1) creation of radio drama using youth and elder voice that adheres to ELM guidelines; and 2) determination of the effectiveness of the radio drama intervention based on reported soft drink intake, knowledge and attitudes from pre- and post-intervention surveys.

The secondary objectives included determining any relationship between the following variables and soft drink consumption:

- traditional food consumption
- food behaviours (full meals vs. snacks)
- other beverage intake
- sex
- parent and friend attitudes and behaviours towards soft drink consumption

CHAPTER II: Literature Review

Improving health through education is a complicated task and requires the integration of various disciplines and knowledge backgrounds. The following literature review is divided into three sections compulsory to constructing a health intervention in Nunavut: first, understanding of Inuit diet and foodways; second, soft drink consumption, its prevalence and consequences in the Canadian North; and finally, a review of communication theories for health education.

2.1 Introduction to Inuit Diet

2.1.1 The Inuit Diet: Importance to Culture and Identity

The traditional Inuit diet is deeply tied to culture and values. Hunting and gathering practices are heavily reliant on spiritual beliefs; giving thanks to the Creator and respect for the land and animals [12]. Food preparation revolves around family and a sense of community, affirming social values and cultural norms [13]. And finally, food exchange and sharing are central to Inuit social organization [12].

Searles (2002) explains that food plays a role in Inuit identity via three main routes: food sharing and exchange, Inuit food and its effect on the body and mind compared to non-Inuit foods, and the logic behind Inuit foodways. Local food exchange networks have played a central role in the Inuit culture. In extreme winter weather, when the food was scarce or when an individual was unable to hunt and gather food for their family, other community members would provide the necessary sustenance. Similarly today, community freezers are often used to store and make available traditional food for community members who otherwise may not have access to it [12, 14]. Among Inuit, traditional food is believed to have health-giving properties in that it helps to keep the blood strong and the body warm during long hunts and cold Arctic

weather [12]. In an interview, by Edmund Searles [12], an Inuit male hunter and his family explained their belief that walrus meat is considered one of the best sources of vitamins, minerals and of warmth. Further, this family explained that even if eaten frozen, seal meat will 'keep your body warm the entire day'. The roles and rituals that surround Inuit foods are unique and explanatory of Inuit culture. These characteristics play a role in defining traditional Inuit foodways [12].

Inuit culture and identity has been greatly tied to food and foodways in the past. This trend continues today and is greatly protected by the Inuit in the face of changing environments and the availability of non-Inuit foods [12, 15, 16]. However, to retain tradition and values in a very contemporary Canada is a difficult feat.

2.1.2 Country Food and Market Food

Currently, the Inuit of the Canadian Arctic have identified 194 different food species available for consumption, including land and sea animals, birds and plants [13]. Specific to the Baffin area, there have been 79 species identified and seasonality plays a significant role in the availability of certain traditional foods ([14] - Harvest Calendars). The most commonly consumed traditional foods consumed in this area include caribou, seal, narwhal and Arctic char [17]. However, climate changes and weather patterns have an effect on the availability and population health of species available for consumption [18].

With colonization came the emergence of new dietary options. Foods bought from the store, referred to as 'Market Foods' (MF), were available in addition to traditional foods (TF) hunted and gathered from the land, also referred to as 'Country Foods' (CF). Researchers promote that traditional foods be included in increased amounts in the Inuit diet, based on high nutrient content and cultural importance [13, 19, 20]. Concern arose when there was found to be an increasing number of environmental contaminants in TF [21] and those most

worrisome include organochlorines, chlordane and toxaphene, and mercury [13]. However, Kuhnlein et al. (2001) has indicated that there is still greater benefit of consuming traditional food, in 'good sense' serving sizes, than there is risk [17, 22].

Benefits of the traditional Inuit diet are plentiful and are noted for their high fatty acid composition and heart protective effects [14, 23, 24]. Diabetes-protective effects, high iron, vitamin D and high antioxidant values are also currently being researched in foods from Canadian Arctic regions. A diet high in marine species (high proportion of TFs consumed) is proposed to help maintain healthy blood glucose levels and result in a low blood insulin spike after consumption [24]. Additionally, bioavailable iron content is high in TF, particularly in ringed seal and caribou. A 1998-1999 Baffin adult survey found that ringed seal and caribou provided a great deal of the iron consumed during autumn, providing 42.6 percent and 24.6 percent, respectfully [14]. Vitamin D is also found in high concentrations in beluga and narwhal blubber, ringed seal liver and arctic char flesh [25]. Finally, antioxidant status (especially selenium content) is high in TF and indicated to protect against ischemic heart disease and prostate cancer [26, 27]. Beyond the nutrient-related benefits of country foods is the retention of social and cultural values, superior taste, increased health due to the physical activity associated with hunting and gathering food, as well environmental friendliness and (sometimes) budget conscientiousness [13].

Even with the research and promotion of country foods, percent of energy in daily diet from TF is still low at only 41 percent among the 62 percent of the adults surveyed (in the recent Inuit Health Survey by Egeland et al.) who consumed any traditional food in the past day [14]. The other 61% of energy intake comes from Market Foods (MF) available at grocers in the Canadian North. Perishable and non-perishable foods are available in northern Canadian grocers although weather conditions and mechanical plane issues can cause

problems with reliability and variety of stock. Market foods being consumed in the highest quantities in Canada's Inuit communities include white bread, sugar drink crystals, lard, potatoes, ground beef, frozen dinners, processed meats and carbonated soft drink beverages [1, 13, 14]. These MFs are low quality with low nutrient density, high fat content and are highly processed [16]. Energy-dense market foods are replacing high quality, nutrient-dense country foods, and in a recent study by Egeland et al. (2009) plasma *trans*-fat was inversely associated with traditional food consumption (Spearman *rho*=-0.44, $p<0.01$) [14]. The same study found that individuals who reported eating no country food in the last day, consumed two-times as much saturated fat compared to those whose majority of energy intake was from country foods [14].

A recent paper by Ford (2009) explains the roles of both country foods and market foods in the Inuit food systems [18]. Country food is noted for its effect on bringing community and families together to partake in meals as a group. In opposite fashion, market food is thought to be consumed individually in a solitary setting. Ultimately, the social and economic climate is indicated to have an effect on the choice between CF and MF; that country food is eaten in times of economic disparity and market food in times of environmental instability [18].

2.1.3 Food Insecurity

Food security has been defined as "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" [28] and is based upon three main features: food access, food availability and food quality [18, 29]. Food insecurity is a major concern across the Canadian Arctic. Recent survey results from a Baffin community indicate that this concern is shared by a majority of the community and of the 52 adults who completed surveys, 80 percent indicated that they were 'worried that they would run out of money to buy food before they received their next paycheque' [14]. The inability to afford healthy food (reported by 60 percent of participants), skipping meals (48

percent), and a lack of food in the house (28 percent) during the last month was also reported [14]. Although there is great concern in this community about food insecurity, it is encouraging to find that 82 percent of the participants reported that their friends and family would share country foods when available [12, 14]. Food networks and sharing, concepts important and central to Inuit culture, are helping to mitigate the state of food insecurity [12, 30, 31].

One factor in food insecurity is the cost of food. Food costs in the North are high and a recent comparison showed that the price to feed a family of four for a week in a northern Nunavut community is almost two times the amount as that in Montreal [32]. Not only is it expensive to purchase market foods, but gas and bullet prices are also on the rise and therefore increase the costs of traditional foods in the North [33]. The rate of unemployment in the North is high and is problematic when trying to compensate for increased costs of living [34].

Climate change is an additional factor that plays a major role in food insecurity. As examined by Ford (2009), climate change is responsible for changing ice conditions, thereby decreasing access to hunting areas and habitat of animals central to the traditional country food diet [35]. In a case-study approach, Ford investigated the effects of climate patterns in 2006 on the situation of food security in Igloolik, Nunavut [35]. The weather was not typical of Igloolik during the year of 2006 and resulted in a lack of floating ice in the summer and a late freeze up of the surrounding waters in the winter. These abnormalities caused less food to be available in the summer, specifically walrus that normally habitat on floating ice, and a later harvest of food in the winter. Ford (2009) identified that the vulnerability of the food system is based on 'exposure and sensitivity of a food system to risks and its adaptive capacity to deal with those risks' [18]. Therefore, individuals that rely on traditional foods count and specific weather and animal movement patterns during each season must be able to adapt and

find different or new food sources. When climate change interferes with plant and animal habitat, food access and availability can be greatly affected [18, 36].

Food insecurity in the North is prevalent and due to a multitude of factors. Rising costs of living coupled with high rates of unemployment and changes in the environment due to climate change are making for unstable food conditions [14, 18, 33]. These issues are affecting access, availability and quality of both market and traditional foods in the Canadian North.

2.1.4 Nutrition Transition

Nutrition transition is a term used to describe changes in traditional diet due to the globalization of economy and society, acculturation, and climate change [37, 38]. This phrase represents the shift of a diet relying heavily on complex carbohydrates and fibre (common in many societies) to that which includes increased fat, refined carbohydrates and sugar, often occurring in low-income countries or populations [37]. This is blamed partly on more global availability of cheap vegetable oils and fats, rendering more high-fat processed and packaged sweets and prepared foods [37]. Additionally, although not main factors, global climate change, the changing migratory patterns of animals and growing conditions for plant species are believed to be attributing to nutrition transition [16, 18]. This rationale pertains most specifically to cultures that rely heavily on a traditional hunting-gathering approach.

In terms of the Inuit diet, nutrition transition is being portrayed as a movement away from country foods and towards market foods [16]. In a 1998-1999 adult dietary assessment survey in the Baffin region of Nunavut country foods were the top providers of protein and micronutrients, however market foods, table sugar and soft drinks, were the top contributors of carbohydrates at 18.1 percent and 11.8 percent respectively in the autumn, and 13 percent and 10.9 percent in the late-winter [14, 39]. In the same community a recent survey indicated that youth are also consuming a large amount of market foods and of special mention

was that there was an average consumption of over 1 litre of sweetened beverages per day [1]. Inuit youth are a generation seeing significant cultural change and thus are a group which health workers are particularly concerned.

This nutrition transition coupled with reduced physical activity is believed to be linked to the concurrent epidemiologic transition [19]. Research indicates that obesity, heart disease, diabetes, and metabolic disorder are on the rise in Canada's Arctic [19, 20, 40]. Currently there is an indication of increased obesity, pre-diabetes and diabetes rates - both diseases linked to diets high in fats and refined carbohydrates [14, 19, 41]. Based upon a pilot health screening of volunteers in a Baffin NU community, there was a high prevalence of central fat patterning, lipid abnormalities and metabolic syndrome [14]. Additional studies found that Body Mass Index (BMI) in Arctic indigenous communities was high, with obesity prevalence at 38 percent in Inuit women aged 41-60 yrs and 21 percent in men aged 41-60 yrs [20]. Weight measurements based on the 2000 Centers for Disease Control and Prevention (CDC) Growth Charts were taken in an Inuit youth survey (ages 11-17 y) and results found that 39 percent of the girls and 31 percent of the boys included in the survey were in the at-risk-of or over-weight category [1].

Results from health and nutrition research of Inuit communities are pressuring health departments to focus more resources on chronic disease and its prevention through health and nutrition education [42]. Various studies are proposing that this education needs to begin with the promotion of healthier market food choices and increased traditional food consumption while focusing on moderation [14, 20, 33, 43, 44]

2.2 Soft Drink Consumption in the Current Inuit Diet

2.2.1 Overview

The nutrition transition that is occurring in the Arctic has been studied by researchers at The Center for Indigenous Peoples' Nutrition and Environment (CINE) at McGill University [1, 14, 16]. In research thus far, one very obvious and concerning dietary change in Canada's Inuit is the drastically high consumption of sweet and carbonated beverages, primarily soft drinks [1, 14, 16]. Over a period of years and sometimes even months, high (greater than 1 serving or 8oz. per day) intake of non-diet soft drinks can cause a range of deleterious health consequences including obesity, decreased bone health, and oral health issues [45-47]. Few health promotion solutions to this problem are available and have often not been evaluated for efficacy. Soft drinks are a very small part of the overarching nutrition transition occurring in Inuit communities, however the amount of soft drink consumption can give significant insight into overall health [47] as well as adherence to a traditional diet of CF [1], and provides a great starting point for researching health education in the North.

2.2.2 Prevalence

Soft drink consumption in the western world is steadily increasing [48-50] and a recent study revealed that 25 percent of Canadian youth report to consume non-diet soft drinks more than once per day [50]. It is clear that high soft drink consumption is a problem that has not skipped the Canadian north, where soft drink consumption is exceptionally high. Survey results in multiple communities seem to be portraying the same picture and results are very similar. In a survey of adult women (n=401, excluding pregnant/lactating women) in Qikiqtarjuaq, NU, soft drink consumption was listed as the number 7 contributor to average daily energy (kcal) intake of both traditional and market foods [51]. A community survey in Kugaaruk, NU, interviewed 93 women aged 15-44 with an average age of 26 years [52]. Soft drinks were reported as the most frequently

consumed market food in the past month (slightly above 50 occasions). Amongst the women surveyed, there was an average of 513 g of soft drink consumption per day [52]. Finally, a 2005 adult dietary survey in Pangnirtung, NU, identified that carbonated beverages were consumed by 86 percent of the study population in the last year, 58 percent in the last day and that there was an average daily consumption of 2 cans (710ml or 24 oz.) per day [14].

In a recent youth study (n=74) in the same northern Baffin community, it was revealed that males (n=38) aged 11-17y consumed an average of 1064.1 ml of soft drinks per day while females (n=36) of the same age consumed 937.4 ml of soft drinks per day [1]. The total average of soft drink consumption for youth in this study was 1002.5 ml ($p<0.05$) of soft drinks per day. Even more interesting, results from this same study indicated that youth who reported being non-TF consumers consumed significantly more soft drink in the previous day than those who did consume traditional foods, 1291.2 ml compared to 794.3 ml ($p<0.05$), respectively [1].

In summary, research indicates that adults appear to be consuming an average of 2 cans of soft drinks per day, while youth are drinking even more at approximately 3 cans per day [1, 14, 52].

2.2.3 Indicators: Dietary Assessment

Dietary assessment is conducted through interviews and survey methods that utilize demographic and socioeconomic data, cultural information, 24 hour food recalls, food frequency questionnaire data and food seasonality information which is derived from Community Harvest Calendars [13, 14, 17, 20, 44, 53].

Food seasonality is important when conducting dietary assessment in communities that rely on foods from the land and have multiple seasons characterized by climate [54]. Community Harvest Calendars have been created by the Center for Indigenous Nutrition and Environment (CINE) researchers at

McGill University in collaboration with Inuit in northern Canada to determine what times of the year certain foods are available [17]. Dietary assessment can then be properly analyzed, with the knowledge that some foods are simply not available in certain seasons or are more plentiful in others.

2.2.4 Consequences

Obesity

Researchers are divided as to how soft drinks are associated with obesity. One side of the argument suggests that it is the energy contained in soft drinks is positively correlated with obesity; energy from soft drinks is included in the diet as added energy and is 'not compensated via less calorie intake during the rest of the day from other foods' [47, 55]. Three studies in particular compared the effect of either sugar-sweetened or diet beverages on obesity while considering confounders including diet, demographics and behaviours [56, 57]. The first study, by Tordoff and Alleva (1990), was an intervention study looking at the consumption of soft drinks (diet versus regular) and resulting effects on food intake and body weight in individuals recruited from a university campus (females 28.2 $\pm$2.7y, males 22.9 $\pm$0.8y). Subjects (n=30, n=9 females n=21 males) of normal weight took part in a 9 week study and were assigned (in counter-balanced order) 3-week treatment segments of: 1135 g (4 bottles of ~300 g) of a high-fructose corn syrup soft drink (530 kcal), an aspartame-sweetened soft drink and no experimental drink per day. During the three week period of drinking the regular-sugar (high-fructose corn syrup sweetened) soft drink females gained significantly more weight (0.97 $\pm$0.25kg, $P<0.01$) when compared to the weeks they drank either aspartame-sweetened soft drinks or no experimental drink [58]. Later, Ludwig et al. (2001) conducted a prospective study examining the association between consumption of sugar-sweetened beverages and childhood obesity. In total, 548 children (mean age 11.7y, SD 0.8) were observed for a period of 19 months and the baseline measurements as well as variations in soft drink consumption were assessed via height and weight

measurements and a questionnaire [45]. After considering confounding variables, results revealed that over the 19-month observation period 57% of participants had an increased soft drink intake and the incidence rate of new cases of obesity was up 9.3% from baseline [45]. Ludwig et al. (2001) concluded that the results of their study were consistent with the claim that excess energy intake from sugar-sweetened drinks is not compensated for in the rest of the diet; meaning, there is no decrease in energy intake from other sources of carbohydrates/fats/proteins in the diet, in order to balance the intake of energy from soft drink consumption. Authours believe this therefore contributes to an increase in obesity rates [45]. Finally, a third study by Raben et al. (2002) looked further into the effects of the consumption of sucrose compared to artificial sweeteners and their effects on food intake and body weight. This was a 10 week intervention study and subjects with BMI categorized as overweight (n=41) were randomly assigned to one of two groups; administered either sucrose supplements (n=21, 3.4 MJ) or artificial sweeteners (n=20, 1.0 MJ) each day. In the sucrose group, approximately 70% of the sucrose was given in form of soft drinks and approximately 30% by solid foods. Results from this study indicated that body mass (1.6kg, $P<0.001$) and fat mass (1.3kg, $P<0.01$) increased in the group receiving the sucrose supplements compared to those in the artificial sweetener group [59].

The contrary argument is that it is not the energy in the beverage that results in a positive association between soft drink consumption and overweight or obesity, but instead the diet and lifestyle behaviour(s) that are coupled with high soft drink consumption [47]. This argument is substantiated by evidence found in an observational study by Giammattei et al. (2003); that individuals who drank more than 3 diet drinks per day were more obese than those who drank less than 3 regular or diet drinks per day (BMI z score 1.02 vs. 0.51, $P=0.003$) [60]. Two additional studies reviewed by Vartanian et al. (2007) also showed that the increased energy consumption in the diet of soft drink consumers was higher

than what could be explained by just the beverages, thus suggesting that drinking soft drinks elicited behaviour that increased energy intake via other means [46, 61].

Recent reviews have identified the shortcomings of the evidence provided for correlations between soft drink consumption and obesity. The first issue is that populations consuming high amounts of soft drinks also tends to be less physically active, have higher intakes of total calories, sucrose, fructose and total carbohydrates, and lower intake of cereal fibre and protein [62]. Therefore, dietary and lifestyle behaviours that are associated with obesity and diabetes besides high amounts of soft drink consumption are also present in this demographic [62]. An additional review suggests that many studies are methodologically weak (either cross sectional or observational) and unable to establish causal links and distinguish whether it is the soft drinks or aforementioned lifestyle choices that lead to excess body weight [63, 64]. The effect of sugar consumption on body weight can depend on many factors and therefore studies must account for all of the determining factors over an appropriate period of time [62-64].

If there is in fact a association between soft-drink consumption and obesity it is a great concern as obesity is implicated in the progression of other diseases including insulin resistance [40]. In a recent study looking at the effects of increasing obesity among Inuit, anthropometric measures were examined to find any correlation to insulin resistance (IR_{HOMA}) and the insulin sensitivity index ($ISI_{0,120}$) [40]. Results indicated that insulin values and insulin resistance were higher among those participants who were obese. BMI, waist circumference (WC) and body fat percentage (%BF), all measures increasing with obesity, are correlated with insulin resistance and insulin sensitivity in women ($p \leq 0.05$). In men, %BF correlated with insulin resistance, while %BF and WC correlated with insulin sensitivity [40].

Insulin resistance is a precursor to type 2 diabetes mellitus [65]. Recently strong evidence was found linking soft drink consumption to type 2 diabetes mellitus. A very large prospective study by Schulze et al. (2004) followed 91 249 women for a duration of 8 years. Women who drank 1 or more servings of soft drinks per day had a relative risk (RR) of 1.83 (CI 95%, 1.42-2.36) of developing type 2 diabetes than those who drank one or less servings per month [46]. Therefore, this study indicated that high consumption of regular soft drinks significantly increases the risk of type 2 diabetes mellitus.

Nutrient Intake

It has been previously proposed that consumption of market foods, particularly those high in sugar and fat, replace traditional foods in the Inuit diet [16]. Traditional foods in appropriate amounts are high and adequate sources of macro- and micronutrients including folate, iron, zinc, B-vitamins, magnesium, copper, phosphate and potassium as well as fat soluble vitamins A, D and E [14, 25, 44]. However, when these foods are replaced in the diet by low-nutrient-dense and high-energy market foods deficiencies often occur [14, 20, 66].

Studies have found that high soft drink intake is often associated with resulting nutrient replacement and low nutrient status [47]. The effect sizes from these studies were aggregated in a meta-analysis which determined significant associations between soft drink consumption and nutrient status. A positive association was found between soft drink consumption and intake of carbohydrates (r=0.13), fructose (r=0.36) and sucrose (r=0.23). Protein, dietary fibre, fruit and riboflavin were all negatively correlated with soft drink consumption at -0.14, -0.31, -0.09 and -0.12, respectively [47].

Bone Health (milk and calcium intake)

Calcium is one nutrient that often becomes deficient in cases of high soft drink consumption when milk is replaced by the sweetened carbonated beverage.

Calcium is required to maintain healthy bone density and strength [67]. Low calcium consumption and high soft drink consumption has been correlated with increased bone fractures (primarily in females) [68] and a three-fold higher risk of dental erosion in molars amongst individuals who consume more than 1 litre of soft drinks per week ($P<0.05$) [47, 69, 70]. One study looked at calcium intake, and milk and soft drink consumption in mothers and daughters (n=197 pairs) [71]. Results from this study showed that calcium was positively associated with high milk intake and negatively associated with high soft drink consumption [71]. These results indicate that soft drink consumption may displace milk consumption and therefore result in lower calcium intake.

In a 1999 study by Harnack et al., preschool, school-age and adolescent children who drank more than 266ml/day of soft drinks were 2.9-3.9 times more likely to consume low levels of milk (<237 ml/day) [55]. In a meta-analysis by Vartanian et al. (2007) results compiled from studies looking at average milk intake and soft drink consumption found that the overall correlation for milk intake was r=-0.12 when soft drink consumption was high [47].

Analysis of survey results from a Baffin Island community also seems to indicate that low milk consumption is often coupled with a diet high in soft drink consumption. In the Baffin study group of n=74 youth, the average milk intake was 235.3ml per day while average soft drink intake was 1002.5ml per day [1]. However, more research is required to make definitive conclusions about this issue in the Canadian north.

Lactose intolerance in the North is a concern for health campaigns promoting alternative options to soft drinks. Unfortunately research available on lactose intolerance in the Inuit population is outdated and when evaluated together, arrives at no definitive conclusion [72-74]. Results from individual studies show that there may be higher prevalence in Inuit compared to other Canadian populations. Additionally, Inuit self-report lactose intolerance as being a

limitation of milk consumption [72, 73]. However, it is still recommended that milk and milk products be promoted (to be consumed in small amounts more often rather than large quantities) in health interventions within populations where no conclusive evidence saying otherwise can be found [73, 74].

2.2.5 Risk Factors

Risk factors for high soft drink consumption include both sociodemographics and behaviours. A study of grade 6 and 7 adolescents in 38 randomly-selected Norwegian elementary schools found that boys (OR=2.1, 95%CI 1.8-2.5) were more likely to consume regular soft drinks more than twice a week compared to girls [75]. Survey data from a northern Baffin Inuit population seems to follow the same trend as indicated in the 'adolescence study' (Bere et al., 2007) listed above: that males consume more soft drinks than girls. In this Baffin community it was found that on average adolescent males consumed more soft drinks than females, at 1064.1 ml and 937.4 ml respectively [1]. Although the sex difference was not found to be statistically different within this Inuit community (small sample size was an issue) this does indicate an alignment to previously determined trends. It is also noted that age also plays a role. Within the same Baffin Inuit community, it was found that adults consumes an average of 1-2 servings of soft drinks per day [14] while youth consumed close to 1 litre (or approximately 3 cans) [1]. This may be explained by the differing behaviours of older generations compared to the younger generations, such as adherence to a traditional lifestyle [20].

Besides demographic determinants there are significant associations between behaviours and soft drink consumption. In one case it was found that in Inuit youth adherence to traditional lifestyle was correlated with lower rates of soft drink consumption. It was discovered by Yohannes et al. (2009) that when traditional food consumption is high soft drink consumption is lower; soft dink consumption was at 794.3 ml/day in those who consumed traditional food

compared to 1291.2 ml/day in non-consumers ($P<0.05$). This is also confirmed by studies examining the nutrition transition in the Canadian North, indicating that high intake of market foods is correlated with lower intake of traditional foods [13, 14, 37].

Television watching is another behaviour that is often associated with increased energy intake, including soft drink consumption. A study by Temple et al. (2007) exploring energy intake, found that when children were exposed to a dishabituating stimuli while eating (such as television) they consumed more calories than the group that was not exposed. The conclusion was made that television can dishabituate eating and therefore cause increased energy intake while watching TV [76]. An additional study looking specifically at soft drink consumption and time spent watching television and found that the youth (11-13 yrs) who spent more time watching TV also consumed more soft drinks ($r=0.27$, $P<0.001$) [60].

Finally, parental (especially mothers', in the case of young girls) consumption of soft drinks may also influence child's consumption of soft drinks. Mothers are believed to have this influence due to their possible responsibility for household purchasing, types of beverages that they are providing during meals and snacks while in their daughters' presence, as well as role modeling and consuming soft drinks themselves [71]. The study by Fisher et al. (2000) found that daughters who had mothers that drank milk more frequently and consumed lower amounts of soft drinks followed suit and also drank milk more frequently and less soft drinks when compared to their study peers [71].

2.2.6 Solutions: Health Promotion, Nutrition Interventions, and Policy

Healthy Eating

The consumption of country food is important to Inuit [12], it is highly correlated with decreased disease risk [14, 20], and is very often available even with seasonality (it is important to note that sometimes country food is available at

the community level but not necessarily at the household or individual level) [35, 53]. Therefore, effective health promotion programs targeted at increasing country food consumption could help to relieve the burden of nutrition transition in the Inuit [14, 66]. Some may argue that if more CF were consumed, animal populations may not be able to support the increased demand given the current size of the communities. However, it is noted that even small amounts of country food in the diet can significantly increase nutrient intakes [77].

Community-based models for intervention work allow for cultural adaptivity and seem to be accepted and effective [3, 78]. Current healthy eating interventions in Inuit communities are focusing on the importance of eating nutrient-dense market foods and increased TF consumption in a return to the country food diet.

High-level strategy on improving health and nutrition in Aboriginal communities across Canada, including Inuit, is being implemented by Health Canada and Indian and Northern Affaires Canada (INAC). Some of the current health programs include The Aboriginal Diabetes Initiative, which teaches individuals how to maintain a healthy lifestyle and eat properly in order to avoid type 2 diabetes [79], and The Food Mail Program which subsidises healthy and nutrient-dense food choices to be available to remote communities [80]. Health Canada has recently introduced the new First Nations, Inuit and Métis Food Guide [81] and more specifically the Government of Nunavut (GN) has released the Nunavut Food Guide which is targeted for an Inuit audient and includes recommendations for TF available in the Nunavut territory [82].

At a community level in Nunavut, health clinics are often used as a site for teaching nutrition information. Some communities in the Baffin region have a community dietician that has been hired by the Baffin Regional Health and Social Services Board. Their mandate is to fulfill goals set by the Territorial Public Health Strategy and *Nutrition in Nunavut: A Framework for Action [83]*. The Baffin Regional Health and Social Services Board provides materials for

community dietitians and ensures that pamphlets and information to be given to patients is available in Inuktitut [83, 84].

Certain community-run organizations are also getting involved in health promotion. The Pujualussait Center, a community-run health center in Pangnirtung NU, in partnership with CINE at McGill University, has focused its efforts on promotion of healthy food consumption at the local Co-op grocery store. This intervention called, the "Co-op Healthy Food Corner", offered packaged ready-to-prepare dinners, lunches and snacks for 2-4 people comprised of uncooked country foods, whole grain pastas and rices, fruits and vegetables as an alternative to commercially frozen ready-to-eat meals. This intervention aimed at increasing community knowledge of healthy foods at the point of sale for a budget-conscious consumer.

Soft Drink Consumption

A limited number of studies detail the development, implementation and evaluation of an intervention focusing specifically on soft drink consumption. Healthy lifestyle interventions often target many behaviours at once, however singling out one specific behaviour such as soft drink consumption, may allow for greater study of health behaviour change and result in more effective changes to health programming [85].

Research is divided on the effectiveness of promoting behaviour replacement. Such is the case in replacing soft drink (or 'sweetened beverage) consumption with water consumption. The Fun, Food and Fitness Project (GEMS-FFFP) was a study of an all-girls summer day camp that took place in Houston, Texas, and promoted healthy lifestyle in order to prevent obesity [86]. Girls that were assigned to the treatment group (n=19) attended a 4-week summer day camp and 8-week at-home internet intervention both including GEMS-FFFP healthy lifestyle messaging. Those assigned to the control group (n=16) attended a different 4-week summer day camp and monthly home-internet intervention

that had no inclusion of the GEMS-FFFP health messaging. Part of the treatment program emphasized increasing water consumption and the four specific focuses included: first, to increase preference of water by increasing exposure; second, to increase home and camp accessibility of water; third, to promote drinking 5 glasses of water each day; and finally, attempt to increase preference of water by teaching to select water over sugar-sweetened beverages, to set a goal and then to reward when goal was met each day and to take action when it was not [86]. At the 12 week follow-up period, results indicated that the treatment group had higher average water intake (1.3 vs. 0.9 servings over 2 days) and lower sweetened-beverage consumption (2.9 vs. 3.6 servings over 2 days) compared to the controls, however, these results were not statistically significant. A significant limitation of this study was very small sample size which could thereby affect results and conclusions of statistical significance. In any case, this study had significant strengths in its design based on a theoretical framework as well as subject participation and rigorous program evaluation, providing a valuable template for further soft drink reduction campaigns amongst youth [86].

In contrast to the previous study, Loughridge and Barratt (2005) and Muckelbauer et al. (2009) found that there was no decrease of soft drink consumption with the promotion of increased water consumption [87, 88]. Loughridge and Barratt (2005) divided schools (n=3) into one of three groups; installed water coolers plus active promotion, installed water coolers with no promotion, or no intervention [87]. It was found that student water consumption was increased significantly ($p=0.05$) in the school that received active promotion plus water coolers, however in none of the three schools was soft drink purchase by students decreased during the intervention period [87]. In the more recent study by Muckelbauer et al. (2009), 32 elementary schools in lower-class areas of Germany were divided into either the treatment group (n=17) and received water fountains and classroom lessons to promote water

consumption, or the control group (n=15) received no intervention [88]. Results found that after the intervention, the treatment groups consumed 1.1 glasses more water/day. However, there was found to be no effect on soft drink and juice consumption [88].

James et al. (2004) is one of the few studies that looked at the effects of an intervention solely targeting soft drink consumption [85]. This cluster-randomised controlled trial included 644 children aged 7-11 in 6 different primary schools in London, England. Of the 29 classes involved in the study, 15 were randomised to the treatment group and 14 to the control group. In addition to their regular curriculum each class of children in the treatment group received one hour of instruction on healthy eating in each term. Lessons were simplistic in nature and consisted of three parts; first, discourage drinking carbonated sweetened 'fizzy' beverages and teach about a healthy diet; second, each class was given a jar with a tooth immersed in soft drink so that students could watch effects over time; and finally, each class was required to compose a song with a healthy diet message and then present it to the class. Anthropometric measurements and beverage recall diaries at baseline and end of trial were taken. At the conclusion of the 12 month period children in the intervention group reported drinking less 'total carbonated drinks', 1.9(0.5) servings/three days at baseline compared to 1.3(0.6) servings/three days at the end of the 12 month period (mean difference -0.6, -1.0 to -0.1, P=0.02) [85]. Additional results found that the number of overweight and obese children in the treatment group decreased by 0.2%, whereas those in the control group increased by 7.5% (mean difference of 7.7%, 2.2%-13.1%) [85].

Few studies in the North have focused specifically on soft drink consumption. However, one of the most visible campaigns promoting reduced soft drink consumption is "Drop the Pop". This program was launched in spring of 2004 after a gathering of nutrition and dental specialists meet in Nunavut to discuss

the latest Nunavut Health Survey results [89]. Drop the Pop is an annual program that occurs for a week each February in schools across the Yukon, Northwest Territories and Nunavut and encourages students (and teacher/school administrators) to make healthier choices when choosing beverages. The campaign has two parts; the first is a competition between all involved schools to see who can drink the least amount of soft drinks in a week, and the second is an education program that teaches about the long-term deleterious effects of soft drink consumption [90]. Grocery stores and local businesses are more recently starting to get involved in the annual program [91]. Multiple news companies have reported on Drop the Pop [89, 91, 92] making this a popular and well-known event in the North every year. Unfortunately, no structured evaluation of this program has yet taken place and any evidence of effect cannot be reported.

Finally, results of high soft drink consumption from Inuit health surveys are putting pressure on government and health agencies that solutions must soon be implemented [1, 14]. In Canada, food and beverages offered by school cafeterias, canteens and vending machines are regulated by each province and currently the Yukon, Northwest Territories and Nunavut have no policy in place [93]. Many advocate groups are pushing for stricter policy to remove high-fat and sugary foods and beverages, such as soft drinks, from schools. More recently a proposal has been made for a "National Nutritious School Meal Program for Canadian Children" [94]. This proposal indicates that 'diet-related disease', along with 'economic crisis' and 'food price inflation' are decreasing the health of Canada's children. This policy would ensure that all children have access to healthy foods and beverages at school [94].

2.3 Introduction to Communication and Learning Theories

2.3.1 Health Behaviour and Health Education

Qualitative and quantitative research can be valuable tools when used in a mixed-methods approach [95]. It has been suggested that qualitative research is a necessary and capacity building tool for medicine and health [96]. Understanding health behaviour and effective health education is an important step in closing the gap between quantitative and qualitative research.

Bird et al. (2008) recently interviewed elders diagnosed with diabetes and living on Baffin Island. These interviews revealed that health education in the Baffin region was 'not adequate for the northern setting'. Elders felt that their voices were not being heard and that they were not a consideration in making health services and health knowledge accessible [42]. It was found consistently amongst the interviews that a greater focus needed to be placed on creating more effective cross-cultural communication [42].

Public health communication is a mass-scale strategy for health education and promotion [3]. It is approached as either 'institutional arrangements of society', such as policies on taxing and banning certain products, or capacity building within the consumers themselves to take responsibility for their own health [97]. In 1981, McGuire presented a seven-step method for developing public health communication to promote behaviour change. The foundation of this message is to ensure that a persuasive approach is taken in communication program design [98]. The seven steps that McGuire outlines include:

> 'first, identifying the problem as important and ensuring that there are capabilities to change it; second, the benefits of this specific program must outweigh the costs and produce more desirable results than other options; third, understanding the culture and sociocultural factors that may affect the program both positively or negatively; fourth,

> understanding the behaviours and thoughts that lead to the applicable health-related behaviours; five, based on data gathered from previous steps decide on most promising targets and techniques for the health promotion program; six, restate the intended behaviour change and then design the persuasive communication based on source, message, channel, receiver and destination variables; and finally seven, evaluating the program's effectiveness and then monitoring future progress as well as refining choices made in previous steps.' [98]

A significantly large amount of time is spent on program creation, or Step 6 in the McGuire method for public health and communication. Step 6 is what McGuire refers to as the Input Factors [97]. Input variables have been identified as important considerations to be made during the phase of message design, and include:

> *source variables* (credibility, attractiveness, power and number)
>
> *message variables* (style, type of appeal, type of argument, inclusions and omissions, organization and repetition)
>
> *channel variables* (number and type of sensory modalities, direct versus mediated, verbal versus non-verbal, context)
>
> *receiver variables* (amount of participation, demographics, personality, abilities)
>
> *destination variables* (knowledge versus attitudes versus action, immediate versus delayed, change versus resistance)
>
> *adapted from McGuire, 1984, "Communication Input Variables"*

In addition there are multiple factors that contribute to the evaluation of the program. These are called the Output Factors and constitute Step 7 of the

McGuire method of public health and communication program design [97]. They include:

exposure to the communication
attention
liking
comprehension
skill acquisition
yielding
retention of change
search and retrieval of new attitude
decision in accord with the retrieved
behaving as decided
reinforcement of these acts
postbehavioural consolidation

adapted from McGuire, 1984, "Output Factors: Processes Mediating Communication Impact"

The Input Factors and Output Factors can be used simultaneously at the early creation steps of a program, where input factors can be analyzed to determine which already evoke desired output factors [97]. Effectiveness of the program can be determined based on qualitative and quantitative (though scalar measurement) evaluation of the behaviours in the output factors [97].

2.3.2 Radio for Communication

Entertainment education is the use of entertainment media to communicate information to 'promote learning and persuade attitude and behaviour change' [99]. Radio drama is included in entertainment education and has been utilized in many health promotion campaigns thus far [5-7, 100, 101]. Most evaluated radio drama interventions have taken place in developing countries such as those in Africa, Honduras and India and concentrate on promoting healthy sexual

relationships, acquired immune deficiency syndrome (AIDS) prevention, and family planning through behaviour change [5, 7, 100, 101]. In many cases the radio was not only used as a source for teaching basic knowledge about health but also became a means to disseminate information from those who have changed their health behaviours, it was termed 'the ultimate diffuser' [100]. Radio drama has had mixed reviews, where some studies show great effect and others show none or little, this is believed to be due to a lack of theoretical framework on which the programmes are based [3, 6]. Increasingly more information is becoming available on the use of radio for health communication which is providing a larger framework of successful techniques [5, 6, 100, 101].

One particularly interesting radio drama program in Honduras, entitled "Ancestors Never Die" designed by the Academy of Education Development (AED), promoted preventative attitudes and behaviours around AIDS and human immunodeficiency virus (HIV) [5]. This program was modeled using a participatory process and geared towards Garifuna (Honduran Afro community) youth ages 15-24 years. Focus group discussions and in-depth interviews were performed with individuals living in the community as the project was developed. These interviews established needs within the community and ensured that the focus of the radio dramas were appropriate and acceptable for the Honduran youth. The participatory process ensured that local attitudes and values were incorporated into the radio dramas. The program was large in magnitude, consisting of ninety 15 minute radio dramas that aired from May 2005 to September 2005 and then re-aired from November 2005 to February 2006. Messages followed the story of a new family moving into town and included advice from elders and locals in the community on prevention of HIV/AIDS [5]. Over 170 volunteers worked on the project and 16 health educators were trained to coordinate a discussion call-in period after the airing of some of the dramas [5]. A 'rapid assessment survey' of 329 Garifuna youth aged 14-26 followed the first instalment of the dramas in August 2005 indicated

that 61% of the respondents had heard the dramas first-hand and 97% of these youth said they would continue to listen to the dramas [5]. Of these youth, 76% responded that they had spoken with someone about the radio drama at some point. Finally, 68% of the youth had spontaneously mentioned that the dramas spoke about HIV/AIDS, therefore establishing that the intended message was heard [5].

Radio drama has also been used to teach health in Canadian Aboriginal communities. A recent pilot study used a formative research approach in order to establish the needs for diabetic education and availability of education outlets in the communities [4]. The study took place in four different communities in northeast Ontario and integrated multiple community-based activities including radio. The weekly radio show covered current topics related to diabetes and were aligned with the current issues in the community [4]. It is important to note that inconsistency in the regular playing of the radio dramas was a shortcoming of this study. Final evaluation via interviews found that audio drama either in the form of radio or live-access television was successfully received by the community members. Call-in shows following the radio drama or television program received a lot of response and several people commented that this was a good way to reach many people at once [4, 78]. A study by Verrall et al. (2005) took place in a northern Quebec Cree community and used radio as one of many mediums for education to improve infant iron status [102]. Radio dialogues were created by mothers living in the community and broadcast on the local station in both English and Cree. The radio shows were based upon and conveyed the intervention objectives. A phone-in show was held to gather feedback from the community on the radio programming and results indicated that the community appreciated and easily adopted the radio programming [102, 103]. Of the mothers included in the study subject group, 100% indicated that they had heard the radio dialogues broadcast on the local radio station [103].

The previous examples align well with the Aboriginal, and specifically Inuit, culture. Narrative as local storytelling, especially from Elders, such as that mentioned in the AED (2007) intervention, is an effective way to teach health messaging to Inuit as it is a culturally acceptable vehicle that also helps to preserve culture and identity [1, 5]. Elder storytelling adheres to the values of Inuit Qaujimajatuqangit (IQ) also called traditional knowledge. This is defined as 'the collective knowledge of Inuit and includes teachings of values and customs, hunting and food practices, local environment and issues of spiritual importance' [61]. Inuit Elder storytelling plays the primary role in the passing of this knowledge [1, 61]. Teaching traditional knowledge through storytelling has been preserved even in recent generations and continues to play an important role in Inuit culture [1].

Radio dialogue has been found to be increasingly effective when done in concert with interactive activities, such as call-in shows, street performances, educational materials available at clinics/schools or community activities revolving around the dramas [100-102, 104]. A school radio program in Bolivia required that students listen to radio drama about the causes and consequences of diarrhoea and then complete activities revolving around the messaging. Evaluation of the program identified that in the 913 students there was significant knowledge gain about why diarrhoea is bad, how people get it, and how to prepare and then give the treatments [104].

It is also important to note that collaboration between health communicators and mass-media professionals can become complicated. A significant concern is the conflicting goal between the radio broadcaster and the health promotion worker; quality of the entertainment versus quality of the message [105]. Dickinson (1995) explains that on the surface both parties seem to be united, however radio stations are less willing to include controversial messaging for fear

of losing listeners and health professionals are concerned that this outlook can compromise the message. Argument is made that is it in fact not the medium which is to blame in unsuccessful radio health interventions, but instead the 'inability for health professionals and radio professionals to fully understand the role and priorities of one another and collaborate successfully' [105, 106]. Better communication, understanding and compromise between the two groups are suggested for better results [105].

2.3.3 Communication Theories

One common criticism of health educators is that intervention programs are often not based on theory [2, 3, 107]. Glanz et al. (2008) explains that a PRECEDE-PROCEED Model approach to intervention work will eliminate this problem, forcing health professionals to base their intervention work on study-appropriate theoretical frameworks that can be more effectively evaluated. The PRECEDE-PROCEED Model assists health professionals to combine theories and tools such as media and printed materials in order to provide a detailed plan for intervention programs [3]. The latest revision of the PRECEDE-PROCEED Model, in 2005, took into account the increasing use of participatory research in public health programs and now consists of 4 planning phases, 1 intervention phase, and 3 evaluation phases[107]. This framework can be exceptionally useful for health professionals wishing to use health education theories and available tools in novel combination. The following theory addresses the use of entertainment media and its role in behaviour change – a theory which can be used in combination with radio in the PRECEDE-PROCEED Model to produce an effective health intervention.

Extended Likelihood Model (Dual Processing Theory)

The primary goal of any health intervention is behaviour change. Whether it is a campaign for teaching better sexual health [5], awareness about childhood diarrhoea and how to treat it [104], or family planning [7] each is focused on

changing behaviour. Behaviour change is a complicated process in which Petty and Cacioppo attempt to explain through the Elaboration Likelihood Model (ELM), first developed in 1986 [10]. Before this time there was great controversy over: one, the effect of attitude on behaviour [10, 108, 109]; and two, the role of source, message, recipient and channel on attitude change [110]. By 1986, Petty and Cacioppo developed a general theory of attitude change, of which goal is to help 'organize, categorize, and understand the basic processes underlying the effectiveness of persuasive communications' [10]. ELM explains that there are two possible avenues for processing thought, central and peripheral. Peripheral attitude change is temporary and therefore not predictive of behaviour [10]. Comparatively, central attitude change is permanent, 'resistant' and predictive of behaviour [10]. It is therefore the end goal for health interventions to elicit central attitude change as it is more likely to result in behaviour change.

The Extended Elaboration Likelihood Model (EELM) is based on the original ELM, but is tailored for entertainment-education and persuasive messaging (Figure 1). EELM requires that certain characteristics of narrative entertainment education, including radio, must be present in order for central attitude change to take place – the variables that determine how persuasive narrative will be processed [9]. This includes; storyline appeal, quality of production, unobtrusiveness of persuasive text (subliminal messaging), and ability for listeners to relate to characters [9].

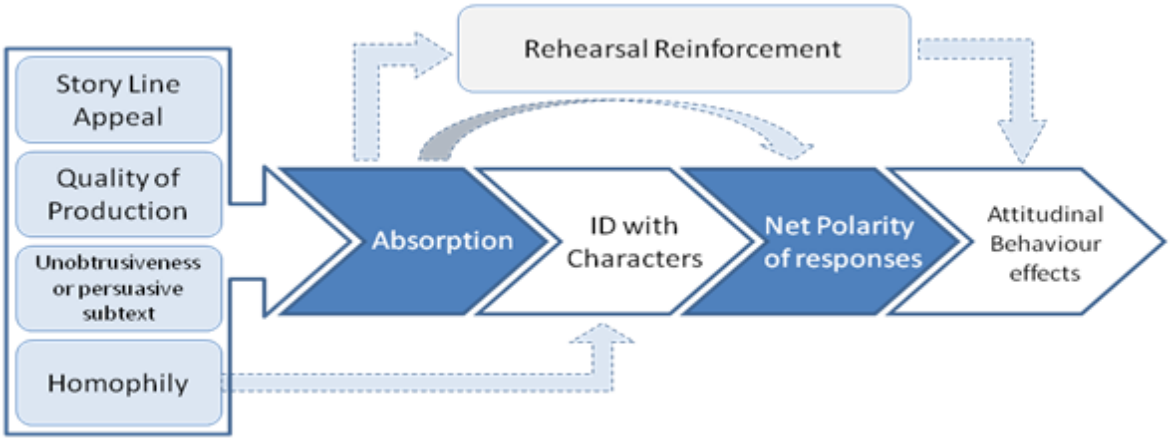


Figure 1: A simplified version of the EXTENDED Elaboration Likelihood Model (EELM), adapted from Slater, 2002.

EELM places most emphasis on identification with characters and engagement with storyline rather than 'issue involvement' with the persuasive topic [9]. EELM was tested before its publication by the authors as short story excerpts of underage youth on a blind date and the negative effects of alcohol while on the date [9]. The short stories were shared with underage youth and the message was clearly about decreasing alcohol consumption, however this was subliminal in the entirety of the message. Results found that this was an effective intervention and that although you would expect a large amount of counter-arguing about this topic in the target demographic (youth), this occurrence was rare [9]. These results confirmed their previous hypothesis that 'persuasive narrative intervention elicits less counterargument in the difficult youth population' [9].

2.3.4 Evaluating Health Education Programmes

The final step in health intervention work is evaluation. Just as Glanz et al. (2008) explained the need for greater use of theory in intervention work, there is also the need for the evaluation of theory-based interventions in order to determine how effectively they addressed the issue. Structured evaluation is important as it can lead to theory development/refinement and ultimately

evidence-based framework and policy proposal [3]. As identified in the PREDCEDE-PROCEED Model, there are three steps of program evaluation; process evaluation, impact evaluation, outcome evaluation [107]. Process evaluation assesses the adherence to previously defined protocol, whereas impact evaluation determines any change in behavioural or environmental factors and outcome evaluation reviews any consequences of the intervention on the target group's quality of life [3]. Quantitative and qualitative methods, such as surveys, biochemical and anthropocentric data, focus groups and interviews can be used in the evaluation of an intervention [3]. There are however, challenges to evaluating theory-based health interventions and often, even choosing the method of evaluation can be difficult [2, 3]. Although these difficulties exist there is still much more to be gained from interventions that are theoretically based and evaluated, as they provide more informed framework for future health promotion programming [3].

BRIDGE

Chapter III considers the literature on Inuit health and diet, soft drink consumption and learning theory presented in the previous chapter (II) in order to meet the first objective of the proposed thesis: creation of radio drama using youth and elder voice that adheres to ELM guidelines.

Guided by the Pangnirtung Community Steering Committee, input from local Pangnirtung youth, and previous research findings the Pangnirtung youth radio dramas were created, recorded and revised.

Previously recorded Elder stories were decided to be the basis of this culturally-appropriate community health promotion as Inuit Qaujimajatuqangit (IQ), the collective knowledge of Inuit passed on by Elders, is a concept central to the Inuit culture. These Elder stories were collected as a means to record oral history of Inuit Elders from the local Pangnirtung community, and a few were used in a previous community DVD intervention (by author, Egeland [1]).

Combining Elder stories and youth dialogue into a singular health promotion activity, as proposed by objective one of the Pangnirtung Youth Radio Drama project, adhered to the requests and recommendations given by the Pangnirtung Steering Committee.

CHAPTER III: Development of Radio Dramas for a health communication pilot intervention in Inuit communities

Cassandra Matta[1], Dr. Frances Aboud[2], Markus Wilke[3], Dr. Grace M. Egeland[1]

[1]School of Dietetics and Human Nutrition and Center for Indigenous Peoples Nutrition and Environment (CINE), McGill University, Québec, Canada

[2]Department of Psychology, McGill University, Québec, Canada

[3]Pangnirtung Community Steering Committee, Nunavut, Canada

Corresponding Author:
Grace M. Egeland
School of Dietetics and Human Nutrition and
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
MacDonald Campus, McGill University
21,111 Lakeshore Rd.
Ste. Anne-de-Bellevue, Québec
Canada H9X 3V9
Email: grace.egeland@mcgill.ca

ABSTRACT

Objective: A mixed-methods approach was used to create a radio drama intervention adhering to the Extended Elaboration Likelihood Model (EELM) for health communication. This study was built around community participation (Participatory Process) to develop and implement the programming.

Methods: Radio dramas were created, recorded, and revised with the assistance of the Pangnirtung Community Steering Committee, local youth and Elders in Pangnirtung, NU. The radio messages were then tested in two focus groups (n=4, n=5) to determine fulfillment of the radio dramas to optimum conditions of EELM theory.

Results: Focus group feedback identified that revisions needed to be made to two characteristics required of educational programs following the EELM theorem: first, the quality of the production was improved by adding Inuit-youth recorded music; and second, the homophily (relatability of characters) of radio dramas was improved by re-recording the dramas with voices of local youth who had been trained in media and communication studies.

Significance: The Participatory Process is a powerful tool in the development and sustainability of culturally-appropriate community health programming.

3.1 INTRODUCTION

The term 'nutrition transition' refers to the movement away from traditional foods towards a diet high in market foods (represented by consumption of increased refined sugars, high saturated fatty acids and low fibre). This is a process currently underway in Canadian Inuit communities and is paralleling with increased rates of obesity and diabetes [16, 18-20, 37]. One market food that is of particular concern is soft drinks. A recent survey in Pangnirtung, NU, found that youth are drinking an average 1 litre of soft drinks per day [1]. High soft drink consumption has been linked to increase in dental caries, poor bone health, nutrient displacement in the diet and overweight [47, 69-71]. Reduction in soft drink consumption is strongly recommended by the literature [47] and after Egeland et al. results were presented back to the Pangnirtung community, was also strongly supported by community members. This led to the interest in the development of a community health promotion intervention focusing specifically, on soft drink consumption and generally, on healthy diet and lifestyle.

Researchers believe that community-based interventions need to meet three main conditions in order to be successful [2-4, 111]:

a) First, the community needs to be involved in the development and implementation of the program. By involving individuals at the community level, researchers can properly address the local concerns of the communities, while being sensitive and respectful of community values and norms [4, 112].

b) Second, the community interventions need to be based on theory and pre-existing frameworks, thereby producing informed interventions. Recent research suggests that health interventions based in theory are more effective than those that are not [2, 3].

c) And finally, study developers need to be diligent in selecting the proper target group in order to ensure effective change within the community. This is a

process that could be helped by understanding of local community structure [112].

The proposed project addressed these three concerns in the following ways:
a) By ensuring that the community was involved in every aspect of the development and implementation of the intervention using Participatory Process, as defined by CINE [113].
b) Utilization of the Extended Elaboration Likelihood Model (EELM) for health education and communication proposed by Slater (2002) [8, 9]. The EELM theory is based on the Elaboration Likelihood Model (ELM)[10] but in itself is relatively new, thereby few relevant studies using EELM in a field setting were produced in a literature review. EELM is defined by four basics principals that must be present in any media messaging intended for educational gain and behaviour change. These four qualities include: storyline appeal; quality of production; unobtrusiveness of persuasive text; and homophily, or ability for listeners to relate to the characters[8, 9]. This theorem was designed specifically for mass-media narrative applications, and therefore, very appropriate for a radio drama health intervention based on youth and Elder narrative. The characteristics of EELM causing it to stand out against other possible health education theories are those of self-engagement and identification with the characters[9]. A complaint with using most educational theories in Inuit communities is that they are more suited to 'Southern' populations and do not take into account Inuit values and norms [42, 112, 114]. However, by ensuring self-engagement and identification with the characters in the radio dramas, the EELM can be tailored to Inuit youth.

Radio was chosen as the method for communication because of its great importance to Inuit communities. In smaller communities the local radio station is constantly playing in every household and is often a gathering place for families after dinner. In the community of Pangnirtung, NU, the radio is used to

play music, CBC and local news, weekly bingo and fundraising drives, and listener call-in announcements. Due to its pervasive use radio was identified by the Pangnirtung Community Steering Committee and study investigators to be the best method of community mass communication. The use of radio for mass-media health programming in Inuit communities has not been thoroughly examined. However radio use as a method for teaching Elder knowledge and health education around HIV/AIDS and family planning in community settings has proven to be a very successful tool in multiple studies [5-7].

The goal of the following study was to create a reproducible process of developing radio dramas with health messaging targeted towards Inuit youth, guided by the Extended Elaboration Likelihood Model (EELM) and combining both youth and Elder narrative.

3.2 METHODS

a) Participatory Process for the Pangnirtung Radio Drama Health Intervention

A participatory process was used in all stages of this project, from creation and development to implementation and analysis. The project first began with a member of the Pangnirtung community contacting the Center for Indigenous Nutrition and Environment (CINE) at McGill through the direction of Inuit Tapiriit Kanatami (ITK). This individual was concerned about the health of his community and desired for a health education program to be designed around the community needs. A community steering committee was formed of seven local Pangnirtung health workers and community members. Additional guidance was given by ITK, a national Inuit health organization based in Ottawa, ON. This study followed specific guidelines for Participatory Process research as defined by The Center for Indigenous People's Nutrition and Environment (CINE) at

McGill [113]. For the purposes of this study, the following positions were filled by local Pangnirtung, NU, community members:

A) Defining the intervention: Pangnirtung Community Steering Committee

B) Developing the radio drama scripts: local youth and Pangnirtung Community Steering Committee

C) Recording the Radio Dramas: local youth and Elders

D) Focus Group Evaluation of the Radio Dramas: local community member to assist in recruitment and moderation of the Focus Groups, local youth in focus groups

b) Creation Process of Radio Dramas

Development Process: The radio dramas were developed on the topic of soft drink consumption and created using guidelines of Extended Elaboration Likelihood Model theory (EELM), ensuring four main characteristics were represented; storyline appeal, quality of production, unobtrusiveness of persuasive text, and homophily [9]. Radio dramas were created, recorded by youth in English and Inuttitut (including pre-recorded elder stories), and reviewed with the assistance of local youth in Pangnirtung, NU. As our intended target group was youth, it was recommended by the Steering Committee to include youth as voices on the radio drama. Additionally, because of the reverence for Elders in the Inuit communities, it was also recommended to include Elder voices by incorporating Elder storytelling about how they used to live a healthy lifestyle in the past and how it can be applied today. Previous consent was obtained from the Elders whose stories were used in this capacity. In total 6 radio dramas were created on the following topics, length of the drama is listed beside each: Moderation in Diet (concentrating on soft drinks) 5:29min, Soft Drink Facts (2:22min), Strong Bones (1:01min), Market Foods and Traditional Foods (24:04min), Replacing Soft Drinks with Milk and Water (0:53min), and a

Recipe for a Country-Berry Smoothie (live on air, not pre-recorded). The topic of each drama was guided by research relevant to Inuit health and communities. For example, as the radio dramas were airing in the fall, berry-picking season was at its peak. The community steering committee and study investigators decided this would be an opportune time to include a recipe for a healthy berry-smoothie in the radio dramas. The Community Steering Committee was consulted on multiple occasions to guide and define the development of the radio dramas to ensure its alignment with community needs.

Recording the radio dramas: Two local youth were hired to record the first drafts of the radio dramas. The Marantz Professional PMD660 recording device was used to capture the digital recordings which were then transferred onto a computer for editing.

c) Focus Groups: Evaluating the Radio Dramas Before Going to Air

Recruitment: Participants for the formal focus group evaluation of the radio dramas were divided into two separate groups, 'Youth Council Members' and 'Community Youth'. It was expected that members of the youth council were more likely to be in school or have graduated, are more involved in the community, volunteer/work on health initiatives and have the occasional opportunity to travel to conferences or sporting events. 'Community Youth' represent all other youth in the town, and as they were all contacted and met during the day, they were not currently enrolled or attending school. Thus, these two groups represented different cross sections of the Pangnirtung community. The two groups were comprised of 5 and 4 individuals respectively, aged 16-29 - which is within the Hamlet of Pangnirtung's classification for 'youth'.

Subjects: Youth took part in the evaluation process within their respective groups. The focus group entitled 'Community Youth' consisted of 4 youth, 2

male and 2 female, with an average age of 22 y (SD=3.9, range 17-26 y). The 'Youth Council Members' focus group consisted of 5 youth, 1 male and 4 female, with an average age of 22.2 y (SD=5.5, range 16-29 y).

Compensation: Upon completion of the session, focus group participants received a $55 gift certificate for the Pangnirtung Co-op, with Co-op understanding that voucher "cannot be used towards the purchase of cigarettes or pop". During the focus group session juice and water as well as fruits and healthy snacks were provided for participants.

Ethics Approval: Ethics approval was received from the McGill Institutional Review Board of the Faculty of Medicine under IRB Study Number: A09-M71-05A. The Nunavut Research Institute provided registered ethics approval. The Pangnirtung Hamlet acted as intermediary for payment made to individuals contributing to the project and was updated during the course of the project. Throughout the duration of the study any required license renewals were submitted and approved.

Subject Informed Consent: Informed consent of the participants was required for the focus groups (involved in creation and evaluation of radio dramas) and pre- and post- youth surveys (for the assessment of the intervention). Detailed information forms about the study were included with the consent forms and available for the participant to take. The youngest participants were aged 16 and in the case of any participants being between the ages of 16-17, signed parental consent forms were required.

Hiring Process: One youth was hired to assist in the recruitment and moderation of the focus group sessions.

Focus Group Process: During participant recruitment, youth were explained that the focus group session would range in time from 1 hr to 1 ½ hours. The two focus groups (each with different participants) took place on the same day. Once

youth arrived at the site for each focus group they were asked to read and sign a consent form. Before the radio dramas were played, a short questionnaire about the youth's attitudes and beliefs towards soft drinks as well as their perceived community attitudes towards soft drinks was collected.

A decision was made that it would take too long for the focus groups to listen to all five pre-recorded dramas; youth would become restless and feedback would become less and not provide accurate representation of youth attitudes towards the dramas. Therefore, two of the five recorded radio dramas were then played with a question period between. The same two radio dramas were played for both of the focus groups (Youth Council and Community Youth). The reason that these two dramas in particular were chosen was because they represented two different formats that five of six dramas followed (Table 1): in one format, Inuit youth voices dialogued back and forth in a 'conversation-style' format, for a relatively short length of time (the drama of this format that played in the focus groups was 2 minutes); in the second format, a youth voice introduced and concluded the topic of the drama and the Elder who would be sharing his narrative, the Elder narrative took place in the middle of the recording and consumed the majority of the time (12 minutes of the 13 minute drama played in the focus group).

During the question period of the focus group, youth were asked semi-structured questions about the radio drama that they had just listened to: Did you like the radio drama?; What did you learn from the radio drama?; What did you think was the topic of the radio drama?. Youth were then asked to compare the dramas to determine which they liked better and why. If youth started a dialogue about the radio dramas or the topic of the radio dramas, it was encouraged and discussed in an unstructured manner.

At the completion of the focus group sessions, youth were again offered healthy snacks and beverages, thanked for their time and received compensation.

d) Re-recording of the Radio Dramas

The radio dramas were re-recorded with changes being made based on analysis results of focus group feedback. Consequently, 2 new youth participated in the re-recording and an additional 4 youth assisted with the recording of music, "throatboxing" (a mix of beatboxing and traditional Inuit throat singing). The Marantz Professional PMD660 was again used for the digital recordings which were then transferred onto a computer for editing.

e) Data Analysis

Focus Groups - Radio Drama Evaluation: The intention of the focus groups was to determine the fidelity of the radio dramas to the Extended Elaboration Likelihood Model theorem (EELM). Focus groups were held once the 5 pre-recorded radio dramas were translated and recorded (note: extra radio drama including recipe was always shared live and never recorded) on June 30, 2010. Questions posed to the focus groups were meant to determine if the intended message of the radio drama had been conveyed and understood by the listeners and if the guidelines of the EELM theorem were correctly followed. Additionally, participants were asked what they 'liked' and 'did not like' of the radio dramas and what needed to be improved.

The participants were required to listen to the radio dramas and then indicate verbally what they thought of the radio dramas (ie. quality, captivating storyline, ease of relating to characters). These characteristics aligned with certain properties of the EELM theorem and answers from the focus groups thus gave a value for fulfillment of the radio dramas to EELM.

Focus groups were recorded and transcribed. The transcriptions were analyzed using content analysis to determine if the four characteristics of EELM were present in each drama (storyline appeal, quality of production, unobtrusiveness of persuasive text and ability to relate to characters). A binomial value was

assigned to each of the 4 qualities for the two separate radio dramas that were tested in the focus groups; 0 meant the given characteristic was not included in the drama and 1 meant that the given characteristic was included. For characteristics given '0', the particular radio drama and those following the same format (either youth dialogue or Elder story) were re-written and re-recorded based on youth focus group feedback.

Post-Intervention Survey – Radio Drama Evaluation:
An additional evaluation of the radio dramas took place at the time of the youth post-survey, which included one section in addition to the format of the pre-survey: asking if the youth had heard the radio dramas and to share their thoughts about the radio dramas (what did they like about it and how could it be made better) as open ended questions.

3.3 RESULTS

Focus Group Demographics and Descriptors

'Community Youth' Focus Group: The Community Youth Focus group consisted of 4 individuals (n=4) with an average age of 22 yrs (SD=3.9, range 17-26 y). When asked about beverage consumption, 50% (n=2) of the population indicated they consume soft drinks, with an average of 1.1 $\pm$1.44 cans soft drinks per day. Additionally, youth were asked about traditional food (TF) consumption, to which 100% (n=4) indicated that they did consume TF, at an average of 3.0 $\pm$0.71 times per week.

'Youth Council' Focus Group: The Youth Council Focus group consisted of 5 individuals (n=5). The average age was 22.2 yrs (SD=5.5, range 16-29 y). When asked about beverage consumption, 100% (n=5) of the population indicated they consumed soft drinks, with an average of 1.1 $\pm$0.91 cans soft drink per day. Additionally, youth were asked about traditional food (TF) consumption, to

which 100% (n=5) indicated that they did consume TF, at an average of 3.5 ±2.32 times per week.

Focus Group Radio Drama Feedback: Evaluation of Drama Adherence to EELM

Note that a score of '1' means that the characteristic was 'present' and '0' means it was 'not present' or not in accordance to youth's expectations (Table 2, Table 3).

Feedback from the *'Community Youth'* (Table 2) focus group resulted in the following scores for each characteristic of Radio Drama #1 ('Elder narrative'): storyline appeal (1), quality of production (0), unobtrusiveness of persuasive text (1), and homophily (1). For each characteristic in Radio Drama #2 ('youth dialogue'), analyzed focus group discussion resulted in the following scores: storyline appeal (1), quality of production (0), unobtrusiveness of persuasive text (1), and homophily (1).

Feedback from the *'Youth Council'* (Table 3) focus group resulted in the following scores for each characteristic of Radio Drama #1 ('Elder narrative'): storyline appeal (1), quality of production (0), unobtrusiveness of persuasive text (1), and homophily (0 and 1). For each characteristic in Radio Drama #2 ('youth dialogue'), analyzed focus group discussion resulted in the following scores: storyline appeal (1), quality of production (0), unobtrusiveness of persuasive text (1), and homophily (0).

Focus Group Behavioural Observations

The radio drama containing only 'youth' dialogue was played first and the radio drama containing the Elder narrative was played second. For both focus groups, the speakers playing the radio dramas were set on a table with chairs positioned in a semi-circle around the table. At the beginning of the two focus groups, for the introduction by the focus group moderator and playing of the radio drama #1 with youth dialogue, the focus group participants sat leaning back on their

chairs. Their body position was relaxed. However, when drama #2 with the Elder narrative was played, the youth all sat forward in their chairs and moved closer to the speakers. It is important to note that there was no difference in sound level between the youth introducer and the elder narrative.

3.4 DISCUSSION

Focus Group Evaluation Feedback

There was more feedback and more willingness to discuss in the focus group (FG) comprised of 'Community Youth' when compared to the 'Youth Council' group. However, the 'Youth Council' focus group (FG) was much more critical of the radio dramas, providing more recommendations for improvement of the recordings. FG feedback indicated that youth expect high quality of sound and entertainment value; exemplified by recommendations to have more 'excited' youth dialogue and to include youth-relevant music at the beginning and end of the dramas. The following provides a discussion of results for each of the four characteristics of EELM theory.

The *storyline appeal* was rated high based on feedback from the FG. Youth talked in length about the Elder narrative, how much they enjoyed hearing the Elder and how they thought it was important to listen to Elder teachings. After listening to the youth dialogue about soft drink facts both FGs mentioned multiple times that they were surprised about how much sugar was in soft drinks as well as the cost of consuming high amounts. The discussion steered towards the youth calculating how much sugar they consume and how much they spend on soft drinks, based on facts provided in the dramas they just heard. This personalization of the information given is evidence of self-engagement of the FGs in the radio dramas, supporting the characteristic of *storyline appeal* and adherence to the EELM theorem.

Indication as to the *quality of production* was given when youth recommended that music be added to the beginning and end of the radio dramas. Due to this reason this characteristic was given a value of '0', indicating that changes needed to be made. No mention was made about sound quality in terms of volume or recording clarity was made and therefore was not a concern during the re-recording process.

Unobtrusiveness of persuasive text is difficult to measure in a focus group setting. Slater (2002) explains that including this characteristic in the drama "does not mean that recipients must be unaware of persuasive intent, but simply that the drama must be compelling enough to cause such awareness to fade into the background…" [9]. We thereby evaluated this characteristic by the discussion (amount, liveliness, number of people contributing) around whether the youth enjoyed or did not enjoy the drama. Overall FG feedback about the dramas focused on the new information presented in the youth dialogue and the engaging quality of the Elder narrative. This led study investigators to believe that the dramas were dynamic, engaging and interesting enough to 'cause awareness (of the persuasive content) to fade into the background', and achieve the goal defined by Slater (2002).

Homophily, or the ability of youth to relate to the characters, was found to be high within each FG for Drama #2 which centered around the Elder narrative. However, the 'Youth Council' group indicated in multiple instances that the voices of the youth did not seem exciting and that it was hard to 'connect' to them. This quality was given a rating of '0' for the inability of FGs to relate to the youth voices in the dialogue. This was therefore listed as a top priority in the revision phase.

Based on FG discussions, the following revisions were made to the radio dramas during the re-recording process:

a) Extra attention was made to reference traditional Inuit practices and values, including traditional food (TF) promotion. FG youth valued the traditional information contained in the Elder narrative so we incorporated more information on TF in the existing radio drama scripts.

b) Music was added to the beginning and end of each radio drama. Both FGs indicated that they would like to hear music in the radio dramas, suggesting that it be played at the beginning and the end of the drama. Upon this recommendation a group or 5 youth were gathered to do recordings of a new style of music that Inuit youth had created in the past year, called "throatboxing". It is a combination of traditional Inuit throat singing and beatboxing. Multiple recordings were made and were then aired on the radio with the revised radio dramas during the community intervention phase. It was believed that this would help youth to further engage with and relate to the youth radio dramas aired on the local community radio.

c) Local Inuit youth with training in drama and media studies were hired to re-record the dramas, addressing the issue of focus group youth not finding the radio drama voices engaging.

Focus Group Behavioural Observations

When the Elder narrative was played (Drama #2), FG youth sat forward in their chairs from a previously relaxed position. This behaviour was repeated in both focus groups at the same timing and appears to be a sign of respect for the Elders. Culturally, Inuit have great respect for community Elders, who are regarded as teachers and decision makers [1]. This concept was evidenced in the FGs with one youth stating:

"(it's important to use elder stories to teach because they have) seen it firsthand. They grew up in a camp and then they moved to communities

like Pangnirtung and they know the effects of the junk food and the effects that country food had when they were growing up."

These results give insight into the value of Elders that continues to be upheld in Inuit culture. This also provides evidence that health promotion and education activities in Inuit cultures need to meet the unique needs of the communities. By tailoring health promotion for Inuit culture and using evidence-based research, resources will go to programming that is not only satisfactory to the communities but also more effective.

Participatory Process and the Community

The Pangnirtung community was satisfied with the Participatory Process used for this health intervention and believed that it was important that they were part of the program development and implementation. Locals stated that the radio dramas not only suited the unique needs of their community but that the program could be very well adopted into the community routine (community members looked forward to listening to the radio drama programming the same 4 nights each week). Building community capacity was an additional benefit of using the Participatory Process. At the end of the intervention, over 25 people had been trained and involved in some aspect of the process to develop and implement an effective radio program. The community now has the capabilities to continue to run the same programming or create other programs using the same process. This success has always been the goal behind CINE's Participatory Process [113].

3.5 LIMITATIONS

Project researchers attempted to collect an additional radio drama-specific evaluation in the Post-Intervention survey that was part of the same study (presented in a different paper, entitled "Evaluation of a Radio Drama Pilot Intervention for health communication in Inuit communities"). However,

respondent rate to the questions asking for their input about the Youth Radio Drama show was very low ("What do you remember most about the Youth Radio Drama shows?" 6/30 possible respondents answered," Did you like the Youth Radio Drama shows"? 5/30 possible respondents answered, and "What did you like or not like about the radio dramas?" 3/30 possible respondents answered). This may be the result of: surveyors not following protocol and requiring that all questions be answered unless the participant is uncomfortable sharing an answer; and/or, youth feeling uncomfortable with sharing their opinion; and/or research fatigue, in that community members may be tired of completing research questionnaires. An additional concern is that the questions were not asked clearly, as some answers given did not seem to align with the question asked (ie. Question: "What do you remember most about the Youth Radio Dramas?" Answer: "no"). Surveyors may have had a difficult time translating if the question was not clear enough. Finally, interviewers may have felt a bit awkward as they took the job for the income it provided, but felt uncomfortable constantly following up with people in their own community.

3.6 CONCLUSION

Significance for Future Educational Projects in Inuit Populations

The Extended Elaboration Likelihood Model was a simple but effective tool to build a community health intervention. It provided guidance for radio drama development and a simple format for evaluation. EELM is a tool that could be used by community-based organizations to create awareness or educational campaigns.

Results from this pilot project provide an evidence-based platform to build similar full-scale radio-based health interventions in Canadian Inuit communities. The EELM could also easily be applied to other forms of mass communication, such as TV or communiqués, for communities or populations for which these methods might be appropriate. Inuit communities have full access to the

internet and television programming and it is an important part of the youth culture. Radio was used as the medium in this pilot study because of budgetary and timeline restrictions. Therefore, this format can easily be replicated by communities and health organization groups for which these factors are an issue. However, future research should consider the possibility of using EELM to educate youth on relevant health topics via narratives using other available media outlets, including; television, internet and magazines .

Improving self-efficacy is an important step in the creation of reproducible and sustainable health promotion programming [3]. Even initially effective and well-designed programs not allowing resources to this step are unlikely to be maintained by the community [3]. The involvement of the Pangnirtung community, through the guidance of a Community Steering Committee and hiring of local youth to help develop and revise the proposed radio dramas was a definite strength of the aforementioned health intervention. This Participatory Process resulted in a project targeting the specific needs of the community as identified by the community itself and assisted in building capacity by giving the tools to the community to create their own health intervention without the assistance of an outside group (ie., research group). Based on overly positive community feedback and apparent adoption of health programming, this method of Participatory Process for health promotion interventions would be greatly recommended.

TABLES

Table 1: Radio Drama Description, by Topic, Pangnirtung, NU, 2010-2011

	Style #1: Elder narrative		Style #2: Youth dialogue			Style #3
	[A]	[B]	[C]	[D]	[E]	[F]
Topic	**MODERATION**	**BONE HEALTH**	**REPLACING soft drinks w/ milk and water**	**FACTS on Soft Drinks**	**MF and TF**	**Berry-smoothie recipe**
Who	Elder story		Youth dialogue			Radio announcer
Length	~20min		~3min			~3min
Layout	Story		Short Conversation			Announcement
Information	Broad Message – wisdom sharing		Quick Facts – GN Nutrition Facts			

Table 2: Focus Group 'Community Youth' Commentary and Results, Pangnirtung, NU, 2010-2011

		Focus Group: 'Community Youth'			
		Quality #1: Storyline appeal	**Quality #2**: Quality of Production	**Quality #3**: Unobtrusiveness of persuasive text	**Quality #4**: Homophily (ability to relate to characters)
Radio Drama #1: **Elder Narrative**	Adherence to EELM Theory (1=yes, 2=no)	1	0 (no music)	1	1
	Focus Group Commentary	" …it's great to have elders like him talking about nutritious food." "…if more elders spoke about how nutritious the country food is, then I think that the youth would follow." I agree "yeah I think healthy eating would be better, like for little kids" I learned "I'm not going to try giving my son or daughter pop" I learned "that elders have the knowledge of country foods" "the one with the elder was good, like with the nutrients" Do you think we should use elder stories when we are teaching people about health and nutrition? "definitely" Why? "cause they know the difference between the nutrients that country foods have and that store foods have" It's important to use elder stories to teach because they have "seen it first hand. They grew up in a camp and then they moved to communities like Pangnirtung and they know the effects of the junk food and the effects that country food had when they were growing up."			
Radio Drama #2: **Youth Dialogue**	Adherence to EELM Theory (1=yes, 2=no)	1	0 (no music)	1	1
	Focus Group Commentary	"it's crazy, I didn't know how much sugar went into me before" "how much we spend each year, $2000 for only 3 cans, and some of us drink 5 cans a day" "pop has a lot of sugar! I'm still amazed how much sugar it has in a can" "add a little bit of music in the background. It would catch more attention"			

Table 3: Focus Group 'Youth Council' Commentary and Results, Pangnirtung, NU, 2010-2011

Focus Group: 'Youth Council'

		Quality #1: Storyline appeal	**Quality #2**: Quality of Production	**Quality #3**: Unobtrusiveness of persuasive text	**Quality #4**: Homophily (ability to relate to characters)
Radio Drama #1: **Elder Narrative**	**Adherence to EELM Theory** (1=yes, 2=no)	1	0 (no music)	1	1 (Elder voice) 0-(youth voices)
	Focus Group Commentary	Liked Drama #1 "cause the first one talks about country food" Liked Drama #1 "cause it's more traditional" Does is make a difference to you in how much you remember if you listen to an elder tell about their experiences? "i remember more, not all of it, but some of what they say" (remember some things better than others) "because elders were talking about it, and it was cool" What was good about the radio dramas? "the elders"			
Radio Drama #2: **Youth Dialogue**	**Adherence to EELM Theory** (1=yes, 2=no)	1	0 (no music)	1	0
	Focus Group Commentary	"if they (youth voices on the radio drama recordings) were more excited about it or acting like they were talking to friends maybe more people would believe it and, like connect to them." "there are 36 tsp. of sugar per day (in 3 cans) and I drink 4 pop per day, so that means I drink how much sugar?!" The cost of soft drinks for 6 cans "could be like $5000 then!" "I liked them (radio dramas)… cause we can hear about what they are doing to their bodies" "I liked them (radio dramas)… because I think most people don't know about what is actually in it" "i think the second one (Drama #2) would be more appealing to teenagers" "maybe have music in the background, make it more interesting"			

BRIDGE

Chapter III achieved project objective one and outlined the development and evaluation process of the Pangnirtung Youth Radio Dramas using the Elaboration Likelihood Model for education communication.

Chapter IV, completes objective two: to determine effectiveness of the radio drama intervention based on reported soft drink intake, knowledge and attitudes from pre- and post-intervention surveys. This chapter also looks at secondary objectives, determining any relationship between the following variables and soft drink consumption and how they relate to the Pangnirtung community health intervention: traditional food consumption, food behaviours (full meals vs. snacks), other beverage intake, sex similarities/differences, and parent and friend attitudes and behaviours towards soft drink consumption.

Modifications and considerations were made to both project implementation and evaluation in sensitivity towards some of the current issues and common research challenges in the Canadian North. This is detailed in the text.

CHAPTER IV: Evaluation of a Radio Drama Pilot Intervention for health communication in Inuit communities

Cassandra Matta[1], Dr. James Ford[2], Dr. Frances Aboud[3], Markus Wilke[4], and Dr. Grace M. Egeland[1]

[1]School of Dietetics and Human Nutrition and Center for Indigenous Peoples Nutrition and Environment (CINE), McGill University, Québec, Canada

[2]Department of Geography, McGill University, Québec, Canada

[3]Department of Psychology, McGill University, Québec, Canada

[4]Pangnirtung Community Steering Committee, Nunavut, Canada

Corresponding Author:
Grace M. Egeland
School of Dietetics and Human Nutrition and
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
MacDonald Campus, McGill University
21,111 Lakeshore Rd.
Ste. Anne-de-Bellevue, Québec
Canada H9X 3V9
Email: grace.egeland@mcgill.ca

ABSTRACT

Objective: To determine the effectiveness of a mixed-methods approach to a community radio drama health intervention on soft drink consumption in pre- and post-intervention.

Methods: The study utilized a 'Participatory Process' to develop radio dramas, combining both elder and youth voices with the intent to promote decreased soft drink consumption in Pangnirtung, NU, among youth ages 16-25. First, Elder stories on were aired on the local radio for 6 weeks in Spring 2010 (to promote the Fall intervention) and then Youth and Elder Radio Dramas were aired for 6 weeks in Fall 2010. Effectiveness of the dramas was assessed by paired pre- and post-intervention surveys (n=34) collected through random sampling methodology modified to include convenience sampling. Qualitative data were collected from radio call-in shows during the 6 week period to indicate community adoption of the program.

Results**:** Average age of the study population at the time of post-survey (n=30) was 22.2 yrs (SD=2.96), 13 males (43%) and 17 females (57%). A total of 13 (43%) of youth surveyed heard the radio dramas. In terms of knowledge gained from intervention programming there was significant increase in the correct answer given (between pre- and post-survey) when youth were asked to write the correct Inuttitut word for the concept of 'moderation of food', something explained in an Elder story shared on air (P=0.025, CI 0.045-0.526). Overall, analysis found that youth who heard the radio dramas consumed 1.3 (SE 0.94) cans less of soft drinks the previous day compared to those that did not hear the programming (P=0.09).

Significance: This pilot project showed promising results in decreasing soft drink consumption amongst youth who were exposed to the intervention radio dramas. The results indicate that Elders may play a particularly effective role as

educators for health information amongst the youth population. Feedback from the community was positive and expressed interest that similar projects continue. Qualitative results also indicate that community health radio call-in shows could be an excellent avenue for health communication in Inuit communities. The Pangnirtung community is now aware of and open to radio as a medium for professional health information-exchange. Results from this theory-based, evaluated intervention should be used to structure future nutritional health communication initiatives in Inuit communities, an important step in preventative medicine.

4.1 INTRODUCTION

Recent findings are showing an epidemiologic transition - that the rates of obesity, diabetes and metabolic syndrome are drastically increasing - in the Canadian Inuit population [14, 20]. This trend is coinciding with what researchers have named 'Nutrition Transition'; defined as a movement away from nutrient-rich traditional foods (TF) to market foods (MF) which are high in saturated fatty acids, refined carbohydrates and low in fibre [37].

A 2007 study by Yohannes et al. (2009) in one Canadian Arctic community found that youth are consuming an average of 1 litre of soft drinks per day [1]. The consequences of soft drink consumption include: increased energy intake and body weight [47], increased dental caries [69, 70], poor bone health [68, 71], and the displacement of other nutrient intake [47]. In this same study population it was found that youth who did not consume TF had significantly higher sweetened beverage consumption than those that did consume TF [1]. These data point to TF promotion as being a possible method for health promotion to encourage social relations and behaviours associated with TF consumption also associated with decreased soft drink consumption [1, 14].

Traditional food (TF) is high in nutrients and studies provide evidence that those who consume TF significantly benefit from this food source [14, 25, 43, 44]. TF consumption is also indicative of an adherence to a traditional lifestyle [12, 13]. Following a traditional lifestyle (including traditional values and beliefs) is important to Inuit and has been termed Inuit Qaujimajatuqangit (IQ). IQ has been defined as 'the collective knowledge of Inuit and includes teachings of values and customs, hunting and food practices, local environment and issues of spiritual importance[61]. Therefore when developing a culturally appropriate Inuit health intervention, the promotion of TF and IQ seems fitting as it is not only supported by the literature, but also the Inuit community.

Recently, health intervention work has been criticised for not producing effective and sustainable results [2-4, 111]. Three priorities for a successful community health intervention have been identified:

a) First, the community must have involvement in the development and implementation of the program. By involving individuals at the community level, researchers can properly address the local concerns of the communities, while being sensitive and respectful of community values and norms [4, 112].
b) Second, the community intervention must be based on theory and pre-existing frameworks, and thereby be informed interventions. Recent research suggests that health interventions based in theory are more effective than those that are not [2, 3].
c) And finally, study developers must select the proper target group in order to ensure effective change within the community, a process that could be helped by understanding of local community structure [112].

The following project addressed these three concerns in two specific ways. First, the project adhered to a Participatory Process, as defined by McGill's Center for Indigenous Peoples Nutrition and Environment (CINE), requiring the involvement of Inuit community members in the design, implementation and evaluation of the program. Second, the project followed the Extended Elaboration Likelihood Model (EELM) for education communication as proposed by Slater (2002) [8, 9], a theory decidedly appropriate to the Inuit community and relevant to mass communication. EELM is defined by four basics principals that must be present in any media messaging intended for educational gain and behaviour change. These four qualities include: storyline appeal; quality of production; unobtrusiveness of persuasive text; and homophily, or ability for listeners to relate to the characters[8, 9]. This theorem was designed specifically for mass-media narrative applications, and therefore, very appropriate for a radio drama health intervention based on youth and Elder narrative. A complaint with using

most educational theories in Inuit communities is that they are more suited to 'Southern' populations and do not take into account Inuit values and norms [42, 112, 114]. However, by ensuring self-engagement and identification with the characters in the radio dramas, the EELM can be tailored to the Inuit youth population.

The following radio drama health intervention was a continuation of a community-based health promotion effort which included prior assessment of dietary behaviours through adult and youth health surveys, Elder storytelling on diet and health, and the piloting of health education intervention tools built on relevant messaging. The community steering committee proposed an intervention strategy that included three specific activities: first, the documentation of traditional Elder knowledge via recorded interviews to later be transcribed; second a grocery store initiative promoting healthy food purchase at point of sale and collaboration with radio to advertise the intervention; and finally the creation and airing of radio dramas that promoted healthy eating using the previously recorded Elder stories [14]. This project fulfilled the third proposed activity.

4.2 METHODS

a) Study Design

This study took place in the town of Pangnirtung, Nunavut, located on northern Baffin Island at 66.08 N latitude and 65.42 W longitude [115]. The community is accessible only by plane during the winter months and for a short period of time when the ice breaks up in the summer by boat. The population of Pangnirtung is roughly 1325 with minor fluctuations due to seasonal variation of people leaving for travel or to live on the land [116].

This radio drama intervention used Participatory Process [113]. The project first began with the design, creation, recording and evaluation of the proposed radio dramas in accordance to the EELM education communication theory. The process of developing and evaluating the radio dramas before they went on air was presented in a previous chapter of this thesis entitled "Development of Radio Dramas for a health communication pilot intervention in Inuit communities". The airing of the radio dramas took place in a two-stage approach on the local radio station of Pangnirtung, NU. In stage 1, the pre-recorded elder interviews were aired weekly during the Spring and Summer 2010 in order to create awareness in the community that the radio would be used for additional programming besides music and the news, and to inform the community of the upcoming radio drama programming. In stage 2 the pre-recorded radio dramas with youth and elders were aired during the Fall/Winter 2010 for a period of 6 weeks. The effectiveness of the dramas was assessed via pre- and post-intervention youth surveys. A pre-survey was administered and collected before and during stage 1 and post-survey after stage 2 of the radio intervention. Additionally, feedback from weekend community call-in shows, with the presence of a health professional, was gathered to further assess the radio programming. This methods section focuses on the pre- and post-survey evaluation of the radio drama health intervention in Pangnirtung, NU.

Pangnirtung youth, ages 16-27, were involved with development of the study utilizing a participatory process to generate radio dramas, combining both elder and youth voices with the intent to promote decreased soft drink consumption. Creation of the radio dramas was in accordance to the Extended Elaboration Likelihood Model Theorem (EELM). Radio drama messages were recorded in both Inutittut and English. The dramas were then tested via focus group with Pangnirtung youth to determine fulfillment of EELM theory.

Participatory process

A participatory process was used in all stages of this project, from creation and development to implementation and analysis. The project first began with a member of the Pangnirtung community contacting CINE at McGill through the direction of Inuit Tapiriit Kanatami (ITK). The individual was concerned about the health of his community and desired for a health education program to be designed around the community needs. A community steering committee was formed of seven local Pangnirtung health workers and community members. Additional guidance was given by ITK, a national Inuit health organization based in Ottawa, ON. This study followed specific guideline for Participatory Process research as defined by The Center for Indigenous People's Nutrition and Environment (CINE) at McGill [113]. For the purposes of this study, the following positions were filled by local Pangnirtung, NU, community members:

A)Airing the radio shows: local radio announcers, local health professionals, local health representatives (CHR)

B) Evaluation process: local surveyors

b) Participants and Recruitment

PARTICIPANTS

Radio Drama Intervention Pre-Survey

Based on sample size calculations for quantitative measurements and discussion with Arctic research experts working with qualitative and survey data, an initial goal of 80 subjects was identified. In total, 34 individuals successfully completed the intervention pre-survey. The average age was 21.6 yrs (SD=2.8, range=16-25yrs). Of the 34 individuals 20 (58.8%) were female and 14 (41.2%) were male.

Radio Drama Intervention Post-Survey

During the Spring of 2010 and Winter 2010-2011, 4 youth that took part in the pre-survey moved out of town and could no longer be contacted. Therefore, in the follow-up post-survey a total of 30 individuals were surveyed. The attrition

rate was 11.8%. The average age of youth in the post-survey was 22.2 yrs (SD=3.0, range=16- 26yrs): 17 (56.7%) of the individuals were female, while 13 (43.3%) were male.

RECRUITMENT

Pre- and Post-Surveys

The intended use of inferential statistics necessitated random sampling for recruitment for the pre-survey. The goal was to collect information from 40 youth from each age group,16-20 and 21-25, (80 subjects total is an adequate number to break down respondent characteristics [35]), however, we intended to contact 200 subjects as non-compliance rates may be moderate [117].

The following two options were originally explored for randomization:
Option 1: A list of the names of youth enrolled in grade 6 during years 1997-2006 was requested from the local school. No personal information other than a name was to be collected. These students would now be aged 16-25. This process ensured that the subject population will be chosen when drop-out rate will not be a factor in recruitment bias. The student lists were to be assigned randomized numbers and 200 youth were to be contacted to participate in the survey.
Option 2: A full list of all individuals between the ages of 16-25 including name and contact information would be collected from the Pangnirtung Community Health Center. The list would then be divided into youth ages 16-20 and ages 21-25. The names on each of these two lists would then separately be randomized, using a random number generator via computer. The first 40 names from each list (ages 16-20 and ages 21-24) were to be contacted and asked to complete the survey.

Unfortunately due to missing student information at the local school, option 1 was not possible. Option 2 was attempted but because of outdated information

at the Community Health Center (names of youth were given who had since moved or were deceased), the process of tracking individuals was taking too long and rendered only 11 (n=11) completed surveys of the 40 listed individuals.

The sampling procedure followed random sampling methodology modified to include convenience sampling. Recruitment for the pre-surveys (n=34) was first done through a simple random sample (SRS, n=11) collected from the randomized community health center lists. When that effort did not yield enough participants because the lists were not up-to-date, additional participants (n=23) were recruited at the local Youth Center, Co-op and Northern Food Mart. Surveyors stood at the door between 11am-3pm during weekdays and weekends and asked each youth walking through their age (if between 16-25), and if they fit age requirements they were asked if they would like to participate in the survey. If the participant agreed, the purpose of the survey would be explained in English and/or Inuttitut, written consent would be obtained, and the survey would be conducted immediately. Participant recruitment and collection of pre-surveys took place between March 10 2010 and June 5 2010. A total of 34 surveys of youth ages 16-25 were collected. Unfortunately the surveyors did not adhere to the study protocol and no refusal rates were collected. However, feedback from the surveyors indicated that 'almost everyone agreed to do the survey because of the iPod draw that they would be entered into'.

Post-surveys required that original participants be followed-up and given a replica of the pre-survey, with and additional sheet attached at the end (Section 4) collecting information specifically about radio listenership. Post-surveys took place between October 21 2010 to January 15 2011. Post-surveys were completed by 30 of the total 34 youth who filled out the pre-survey. The loss of 4 participants was due to moving away, not due to refusal to complete the survey.

Compensation

The Pangnirtung Hamlet acted as an intermediary for payment made to individuals contributing to the project. Invoices were then sent to CINE at McGill University on behalf of the Pangnirtung Hamlet and were settled through proper avenues. A successful working relationship was established and built throughout the course of the project.

Pre-Survey: Those individuals that completed the pre-survey were entered into a draw for one (1) iPod Nano.

Post-Survey: Each individual to complete the post-survey received a $25 gift certificate towards the local Co-op grocery store, with understanding at the Co-op that voucher "cannot be used towards the purchase of cigarettes or pop". Names of individuals completing the post-survey were entered into a draw for one (1) iPod Nano.

Ethics Approval

Ethics approval and Certification of Ethical Acceptability for Research Involving Human Subjects was received from the McGill Institutional Review Board of the Faculty of Medicine under IRB Study Number: A09-M71-05A. The Nunavut Research Institute provided registered ethics approval, NRI-0502909R-M. The Pangnirtung Hamlet acted as intermediary for payment made to individuals contributing to the project and was updated during the course of the project. Throughout the duration of the study any required license renewals were submitted and approved.

Subject Informed Consent

Informed consent of the participants was required for the focus groups (involved in creation and evaluation of radio dramas) and pre- and post- youth surveys (for the assessment of the intervention). Detailed information forms about the study were included with the consent forms and available for the participant to take.

The youngest participants were aged 16 and in the case of any participants being between the ages of 16-17, parental consent forms were dated and signed.

Hiring Process

Local community members were hired during each part of the intervention, specifically: 5 local women, were hired to host the airing of the radio dramas, one individual who had extensive previous experience in radio hosting attended almost all of the radio show airings; 1 community nurse was hired to attend any radio shows with a call-in component; and 8 individuals from the community were hired and trained to conduct the pre- and post- youth surveys. All hirings were coordinated by researchers with the assistance of the Pangnirtung Steering Committee and the Pangnirtung Hamlet Office.

c) Procedures

Airing the Radio Dramas:

Until this particular health intervention over the radio, the Pangnirtung NU radio had been a medium only for news, music, and local communications (i.e, announcements). Therefore, we took a two step approach to air our radio dramas in an effort to increase the effectiveness of the program. In the first stage, Spring and Summer 2010, pre-recorded elder stories (for which permission and consent had been given) were played on a weekly basis. In the second stage, Fall 2010, the radio dramas were played for a period of 6 weeks (4 times/week). The reasoning behind this staged approach was to: first, create awareness that radio was now going to be a medium for more than news and music; and second, to promote the upcoming radio intervention taking place in the Fall. This process was decided upon based on recommendation from the community that promotion of upcoming events is always preferred. Airing elder stories before the radio dramas themselves also helped to create a sense of normalcy in radio play around knowledge exchange.

A community health call-in radio show took place on the first Saturday afternoon proceeding the radio intervention. The call-in show was attended by a community nurse and community health worker professionally trained in health issues such as diabetes and healthy eating affecting the North. At the time of these call-in shows decreased soft drink consumption was promoted.

Conducting Pre- and Post-Surveys and Collecting Radio Show Feedback

Two weeks before the radio intervention a pre-survey was taken from 34 Pangnirtung youth (aged 16-27). This survey was intended to establish baseline soft drink consumption, attitudes and behaviour amongst the intervention target group. The 6 pre-recorded radio dramas were aired on the Pangnirtung radio station for a duration of 6 weeks during September and October 2010. At the end of the 6-week radio intervention, a paired post-survey was conducted amongst the Pangnirtung youth that took part in the pre-survey. This survey was conducted to determine any changes in the baseline measures gathered in the pre-survey and to identify possible effect of the radio drama intervention on beverage consumption, attitudes and behaviours in our survey population.

d) Measures

A study by Dow et al. (2008) which collected qualitative data in a culturally-appropriate manner for Canadian Aboriginal communities was used as a reference for designing data collection methodology for this study [118].

Intervention Evaluation: *Pre- and Post- Youth Survey Questionnaires*

Survey development took place in collaboration with the Pangnirtung community steering committee. Questions contained in the survey were informed by a TF 24 hr Recall Questionnaire and Inuit DVD knowledge-gain study [1]. The survey assessed physical activity, soft drink and other drink consumption, traditional food consumption, nutritional knowledge, self-reported

attitudes of friends and parents towards soft drink consumption and open-ended evaluation of radio programming.

The purpose of the pre-surveys was to determine a baseline measure for general demographics, physical activity (according to the Nunavut Physical Activity Guide), TF intake (24 hour recall and weekly) and beverage consumption (24 hour recall and weekly), nutritional knowledge, and attitudes and behaviours towards soft drink consumption. The pre-survey contained three sections: the first focusing on general demographic information; the second about beverage consumption including soft drink; and the third, about behaviours and attitudes towards soft drinks from friends, family and self. Pre-surveys were collected between March 10 2010 and June 5 2010.

The post-survey measured the same demographic information at the pre-survey - lifestyle, food and beverage consumption nutritional knowledge, self-reported attitudes towards soft drink consumption of friends and family – in order to identify any changes occurring as a result of the intervention. The post-survey was exactly the same as the pre-survey, however, it included one additional section (Section 4) asking 'yes/no' and open ended questions about the radio dramas aired during the intervention period. Subjects were asked if they had heard and/or discussed the radio dramas, with whom did they hear it, what they thought of the radio shows and if they had any recommendations. Post-surveys were collected between October 21 2010 and January 15 2011.

Appropriate dietary recall tools, including food/beverage size models (ie. small glass, large glass, soft drink can or bottle) were available for reference for the participants when answering dietary recall questions. Beverage measurements were made in terms of 'Number of Servings' using props available for reference at the site of the survey. Questions determining physical activity adhered to

Nunavut's Physical Activity Guide to ensure that culturally appropriate measures of activity were used.

An expert in the field of qualitative and survey research was consulted to ensure question quality before distribution and collection of the surveys. The surveys were tested with 2 individuals before being given to study participants to ensure that questions were easy to read and understood.

Local Inuit community members were hired to manage the pre-/post-survey distribution process in Pangnirtung, NU. These individuals spoke Inuttitut and were given basic training in methods applicable to the survey used for this intervention (i.e, how to conduct an unbiased survey).

Intervention Evaluation: *Community Call-in Show Data*

A Community Health Call-In show was held at the completion of the intervention. The purpose was to understand the general feeling about radio drama programming from the community as well as provide an avenue for community members to have their questions about health answered by health professionals (nurses, and Community Health Representatives). Questions, concerns, and comments said during the show were recorded on paper, with no reference to the name of the caller. Information gathered from this community call-in show was compiled to represent a community response to the 6-week radio health program.

e) Data Analysis

The pre- and post- youth surveys were comprised of questions asking for dichotomous and numerical answers as well as open ended behaviour/attitude questions. Statistical analysis was completed using STATA version 11.0. Descriptive and inferential statistics were utilized. Youth were defined as ages 16-27, aligning with the Pangnirtung Youth Council/Hamlet definition of youth. Descriptive statistics were used to describe the survey population at both pre-

and post-survey intervals. Paired statistical analysis was used to examine changes in our subject population between the pre- and post-intervention period.

Differences between the pre- and post-survey in physical activity, food intake (CF yesterday, number of snacks and meals consumed each day, and times of CF consumption each week), and beverage intake (cans of soft drink consumed yesterday and other drinks consumed past day) were reported using two-sample test of proportion and paired Student's t-test. Unpaired two-sample t-Tests were used to assess youth soft drink consumption and sex, youth soft drink consumption and CF consumed previous day ('yes' or 'no'), and youth soft drink consumption and parental soft drink intake ('yes' or 'no').

The impact of the radio campaign was measured using data gathered from the additional section in the post-survey; the proportion of youth who reported hearing the radio dramas. Knowledge gain from hearing the radio show was assessed using the Wilcoxon Signed Sum-Rank test. The relationship of the youth hearing and/or discussing the radio drama and CF consumption was assessed using an independent two-sample t-test. The relationship of youth hearing the show and amount of soft drink consumed was analyzed using only post-survey data of cans of soft drink consumed with a Student's paired t-test (to compare same population between pre- and post-) and then again with two independent sample t-tests (to compare two populations, 'yes was exposed to dramas' or 'no was not exposed to dramas', within pre- and post-). A change score for each individual (cans consumed yesterday in post- compared to pre-) was determined and then compared in an independent two-sample t-test.

Linear regression analysis was performed for pre- and post-survey measures with soft drink consumption as the dependant variable and sex, age, weekly CF intake, number meals consumed per day, number snacks consumed per day, if youth

consumed milk in previous day, and if youth were exposed to the radio dramas as independent variables. Multivariate linear regression was used to determine effects of variables on soft drink consumption (sex, age, CF consumption, number snacks consumed/day, and if youth consumed milk previous day).

A 95% confidence interval (CI) was used unless otherwise stated. Additionally, two-sided p-values were used except for hypothesized variables where a change was expected due to the intervention: cans soft drink consumed yesterday and knowledge change.

4.3 RESULTS

An initial attempt was made to use a list of youth and their respective contact information generated from the local health center. However, of the random list of 40 names generated, those that could be contacted and completed the survey was minimal at 27.5% (11/40). It was discovered that the list available was not up-to-date and 35 % (14/40) of the included names were individuals who had moved or were deceased. Many of the youth, 27.5% (11/40), on the list were on long-term vacation out of town, currently camping out on the land or could not be contact for various reasons. Additionally, 4 individuals (10%) chose not to participate in the survey. After contact with these initial 40 was attempted and results were poor the decision was made to use a different method for recruitment. Convenience location sampling was undertaken at the 2 local grocers and Pangnirtung Youth Center and 23 additional individuals fitting within the age criteria (16-27yrs) completed the survey. This brought the total sample of Pangnirtung youth recruited for the pre-survey to 34 individuals: n=11 from SRS and n=23 from convenience sampling.

At the time of the pre-survey (n=34), which took place during the Spring 2010, the mean age of the subject population was 21.6 $\pm$2.8 yrs; 20 (59%) were female and 14 (41%) male [Table 4]. In total 4 individuals (12%) were currently enrolled

in school (1 in grade ten, 3 in grade twelve) and 13 (38%) indicated that they were working (6 full time, 6 part time, and 1 casual) and 19 (56%) were currently unemployed and not in school [Table 4]. The average education (last grade completed) for those no longer attending school was grade ten (SD=1.32).

The post-survey was paired, therefore used the same sample as the pre-survey, so no new recruitment was required. The post-survey took place during the Winter 2010-2011. There were 30 individuals (n=30) that completed the post-survey; 4 individuals who completed the pre-survey moved out of town and were not available for the post-survey, therefore the attrition rate was 11.8%. Of the respondents, the mean age was 22.2 $\pm$3.0 yrs; 17 (57%) were female and 13 (43%) male [Table 4]. In total 6 individuals (20%) were currently enrolled in school (1 in grade eleven; 5 in grade twelve) and 11 (37%) indicated that they were working (5 full time, 3 part time, and 1 as a sub) and 17 (61%) were currently unemployed and not in school [Table 4].

a) Comparing the Pre- and Post-Surveys (Student's Paired t-Test)

In the overall population using Student's paired t-test, there was a statistically significant decrease in the reported number of times of CF consumption per week between pre- and post-survey, with a pre-survey mean of 3.61 $\pm$1.70 and post-survey mean of 2.32 $\pm$1.12, totaling a mean difference of -1.29 $\pm$0.45 P-value=0.005 [Table 5]. There was a borderline significant decrease (at α=0.1) between the pre- and post-survey in the reported number of meals consumed per day with means difference of -0.23 $\pm$0.17 P-value=0.09 [Table 5]. Again, using a paired t-test there was no significant difference (at α=0.05) found between the pre- and post-test for number of snacks consumed per day or previous day soft drink consumption [Table 5]. Although there was no significant change in soft drink consumption between the pre- and post-survey, in a paired t-test of the population the pre-survey mean was 2.73 $\pm$0.38 cans yesterday and post-survey was 2.88 $\pm$0.27, resulting in a difference of 0.15 $\pm$0.49 [Table 5].

There was no significant difference found in any other variable when compared between the pre- and post-survey results.

b) Radio Drama Campaign

Of the 30 individuals who completed both the pre- and post-survey, 45% (13/30) reported hearing or discussing the radio show [Table 4]. In the knowledge questions of the pre- and post-survey, there was no significant gain found in correct answers to a multiple choice question asking about content of sugar in soft drinks [

Table 6]. However in a pre- and post-survey knowledge question asking the youth to "…write the Inuttitut word for eating only enough until you are full (moderation)" there was a significant increase in the number of correct responses from the pre-survey to the post- (P=0.03) using two-sample test of proportion [

Table 6]. Additional analysis focused on the possible relationship between amount of soft drink consumption and youth who did or did not hear and/or discuss the radio dramas [Table 7]. Post-survey results indicated mean soft drink intake in those who *did not* hear and/or discuss the radio dramas was 3.46 cans $\pm$2.97 while those who *did* hear and/or discuss the radio dramas had lower soft drink intake at 2.16 cans $\pm$1.48, a mean difference of 1.30 (SE=0.94, P=0.09). In a paired change score analysis amongst individuals who had or had not heard and/or discussed the radio dramas it was found that those who had been exposed to the radio dramas had a lesser increase in soft drink consumption between the pre- and post-survey [Table 7]. An analysis of post-survey weekly country food (CF) intake and whether or not the youth heard and/or discussed the radio dramas [Table 7] showed that those who *did not* hear and/or discuss the radio dramas had a lower reported mean 2.17 $\pm$1.78 for the number of times they consume CF per week, compared to those that did hear and/or discuss the

radio dramas with a mean 2.82 $\pm$1.38 for the number of times they consume CF per week, a difference of -.652 (SE=0.67). Independent two-sample t-test revealed that this relationship was not significant at α=0.05.

c) Relationships Between Soft Drink Intake and Specific Variables

Two independent sample t-tests revealed no statistically significant relationship (at α=0.05) between post-test variables: sex and soft drink consumption, CF consumption in the previous day ('yes' or 'no') and soft drink consumption, and parental soft drink consumption and youth soft drink consumption in the previous day [Table 8].

Simple linear regression [Table 9] of post-survey results for snacks consumed per day and cans yesterday of soft drink consumption found a significant relationship, in that, high snack consumption predicted high soft drink consumption with $p \leq 0.01$ (coefficient=0.97, SE=0.34). Linear regression of milk consumption [Table 9] ('yes' or 'no') previous day and soft drink consumption indicated borderline significance (α=0.1) with coefficient=1.85 (SE=1.03) that high milk consumption predicted high soft drink consumption. Although it was not significant, there was a general trend (in paired t-tests) that for those whose heard or discussed the radio dramas had lower soft drink consumption.

Multivariate linear regression analysis [Table 10] relating milk consumption ('yes' or 'no') and whether the youth heard and/or discussed the radio dramas ('yes' or 'no') to dependant variable soft drink consumption, found that higher milk consumption seemed to be a borderline significant predictor of lower soft drink intake (at α=0.1, beta=0.35, p=0.06). Additionally, when independent variables age (continuous) and if the youth heard and/or discussed the radio dramas ('yes' or 'no') were assessed for their impact on dependant variable soft drink consumption, only age seemed to have a borderline significant impact on soft drink consumption (at α=0.1); with increasing age associated with increasing soft

drink consumption (beta=0.34, p=0.08). Due to the single linear regression results of high snack consumption predicting high soft drink consumption, a multivariate regression analysis was performed to examine if snacks and hearing and/or discussing the radio dramas could predict soft drink consumption. In this multivariate model, a high number of snacks consumed per day was significantly associated with high soft drink intake (beta=0.45, $p<0.05$). Although there was a tendency in multivariate analysis for those that heard and/or discussed the radio dramas consumed less soft drinks, no significant results were found.

4.4 DISCUSSION

Changes in variables between Pre- and Post-Survey Data

Paired Student's t-tests indicated that there was a significant decrease ($p<0.05$) in reported times of traditional food consumption from the pre- to post-survey time period. This change is most likely due to issues with seasonality, as the pre-survey was taken in the Spring 2010 while post-survey was taken in the Winter 2010-2011. Since the traditional Inuit diet relies on hunting and gathering, variations in seasons and temperature which are associated with the migration of animal populations and availability of plant species, greatly affects the diet [53].

A linear regression model of the number of snacks consumed per day and cans of soft drink consumed yesterday found a significant relationship ($p<0.01$) in that a high amount of soft drink consumption was predictive of high amounts of snack consumption. Vartanian et al. (2007) explain in their meta-analysis that the extra energy intake in those who consume soft drinks is more than simply the calories coming from the soft drinks alone, leading to the assumption that soft drink intake is associated with increased eating or snacking [47]. This would be in-line with the findings from the Pangnirtung youth pre- and post-surveys which indicate that high soft drink consumption is predictive of high amounts of snack consumption. If these two behaviours are in fact linked, possible future health

promotion focus could focus on promoting healthy snacks in hopes of curbing soft drink consumption. If youth are educated around eating healthy snacks then alternative healthy options for beverages may be explored. Additionally, Searles (2002) explains that traditionally Inuit ate according to their hunger, not adhering to specific mealtimes but instead snacking consistently throughout the day or night. Therefore, consistent snacking or eating between meals could also be indication of adherence to traditional ways. If this is the case, healthy snack promotion centered around TF could be easily adopted by the Inuit population as it aligns with the adherence to traditional values.

Finally, a borderline significant association between high milk consumption predicting high soft drink consumption was found using a linear regression model (at α=0.1). This may be explained by two possible factors: first, that this indicates an acceptance of western culture amongst youth that consume milk; and second, that these youth simply have more money to spend. Soft drinks and milk are not part of the traditional Inuit diet and therefore, these two beverages both consumed in high amounts by an individual person may indicate a movement towards western culture and market foods. Additionally, soft drinks and milk are two of the more expensive beverages in northern Canadian communities such as Pangnirtung, NU, at $2-4/can and $15/litre, respectively. An individual drinking high amounts of both beverages may simply indicate that the youth has more available income.

Relationship between youth who heard and/or discussed the radio dramas and soft drink consumption

The number of youth surveyed that reported to have heard or discussed the radio dramas was 45% (n=13/30). Soft drink consumption seemed to show a trend of increasing over time in our sample population (when data was paired pre- and post-) by 0.15 cans per day. This was however not statistically significant but would be an area of interest for exploration with a larger study

sample size. A possible explanation for this non-significant increase could have been the arrival of the summer cargo ship (called, 'SeaLift') bringing in mass quantities of soft drinks and decreasing the price from $4 to $2 per can. The town of Pangnirtung, NU, is accessible only by plane for 9 months of the year. Therefore, when soft drink stocks at the local grocers are depleted (around mid-February) the stores are required to bring in soft drink by plane (called, 'AirLift') for the remaining months until the ice breaks up and ships can enter the fjord. Soft drinks brought by SeaLift are priced at $2/can, while those brought in by AirLift are $4/can. The pre-intervention survey took place in February-April when soft drinks are $4/can, while the post-intervention survey took place in October-Jan when soft drinks are $2/can. The slight increase (though not significant) in soft drink consumption in the post-survey could be explained by this price shift. The promising news is that while prices dropped by 50%, youth consumption did not increase at the same rate.

The relationship between exposure to the radio dramas and soft drink consumption was analyzed using and independent t-test. It was found that those who heard and/or discussed the dramas reported consuming 1.3 less cans of soft drink in the previous day (post-survey results only) compared to those that did not hear/discuss the dramas ($p=0.09$, borderline significant at $\alpha=0.1$). After looking at paired change scores (post- value minus pre- value for each individual) divided into the 2 groups (those that had heard/discussed the radio dramas and those that had not) it was discovered that youth who *had* heard and/or discussed the radio dramas had a lesser increase in soft drink consumption between the pre- and post-survey of 0.03 cans per day compared to a 0.5 can per day increase in those that *did not* hear and/or discuss the radio dramas (Figure 2). Although not significant, this results in a difference of 0.47 cans more consumed in the group that were not exposed to the radio dramas.

In terms of public health, these results could be quite interesting. Consider that a can of soft drink (Pepsi for this purpose) is 150 kcal per can. An extra 0.47 cans of soft drink consumption per day equals an extra intake of 70.5 kcal per day, resulting in an extra 25732.5 kcal/year. In a normal, healthy human 7200 kcal is required to create 1 kg of adipose tissue (assuming adipose tissue is 20% H_2O) [119] . At this rate, the extra 0.47 cans of soft drink represents a weight gain of 3.57 kg per year in the group of youth *not* exposed to the radio dramas. In the Inuit community, where rates of obesity and type II diabetes are on the rise [14, 20, 40], these values suggest further research into a full-scale intervention based on this pilot project be pursued.

Consistently lower soft drink consumption was found in those who had been exposed to the radio dramas (compared to those who were not) in multiple analysis, including: paired t-test, regression models, not significant. Although the only test that found significance (borderline at α=0.1) was an independent t-test of post-survey soft drink consumption, the results of lesser soft drink consumption are promising that if the same study was explored with a larger sample size there may be significant findings. A possible recommendation for further health promotion strategies targeting Inuit youth could include the use of additional mediums for communication beyond radio. In this pilot 45% of the youth surveyed heard the radio drama, however if additional methods of communication (also informed by the EELM theorem) are also included in the intervention , reach may be increased.

Knowledge gain from the radio drama intervention

One of the most significant results coming from the Pangnirtung radio drama pilot intervention was the knowledge gain between pre- and post-intervention. The youth were asked the same two knowledge questions in both the pre- and post-surveys; one was multiple choice asking them to identify the correct amount of sugar in a can of soft drink, the second was fill in the blank asking the

youth to “write the Inuttitut word for eating only enough until you are full ‘moderation’’. The answers to these questions were given over air via the radio dramas, therefore those who were exposed to the dramas either through hearing it themselves or discussing it with others should be able to answer correctly.

For the multiple choice question about sugar content, there was no significant difference in correct answers when analyzed using a paired t-test. However, for the fill in the blank question asking about the proper Inuttitut word for translation there was a significant gain in knowledge, with a pre-intervention correct response rate of 37% correct compared to a post-intervention correct response rate at 63% ($p<0.05$). It is important to note that the answer to the multiple choice question about sugar content was explained in the radio dramas by a youth, and that the answer the question about the Inuttitut word for moderation was shared by an Elder through a story. This may lead to the suggestion that the Inuit youth are retaining the cultural tradition of respect for Elders. Additionally, it could be the case that youth prefer to hear health messaging from Elders than their own peers. This aligns previous research into the importance of Elders as teachers of health, as Elders are elevated to roles of authority in Inuit communities [1]. In the focus groups held to evaluate the radio dramas before they went to air, youth were instructed to sit in a circle around a digital recorder playing the pre-recorded dramas. The dramas were comprised of a mix of youth sharing facts about soft drinks and Elders telling stories about healthy eating. When the voices on the recordings switched from a youth to Elder, it was observed that each youth in both of the focus groups sat up and forward in their chair, assumed as a sign of attention and respect. This observation corroborates the finding that information shared by the Elders in the radio dramas was better retained post-intervention compared to that shared by youth peers.

These results give insight into the value of Elders that continues to be upheld in Inuit culture. This also provides evidence that health promotion and education activities in Inuit cultures are required to be different than programming in non-Inuit cultures. By tailoring health promotion for Inuit culture and using evidence-based research, resources will go to programming that is not only satisfactory to the communities but also more effective.

Feedback from Community Call-in Shows

The Community Health Call-In Show that took place at the end of the radio drama intervention in the Fall 2010 was a great success, and was the first time that something of the sort had take place in the community. Although the community call-in show was meant to only last 1 ½ hours, the show was extended to 3 hours. Community members expressed their satisfaction with the radio drama programming, explaining that they "enjoyed listening to the elders", "reminded their work colleagues to listen to the dramas on that night", and "looked forward to hearing the dramas". Locals were also encouraged to call-in any questions they had regarding health, and the nurse and Community Health Representative (CHR) present could answer their calls on-air or anonymously. The show continued for 3 hours with back to back health questions being asked on air or over the phone. Questions about controlling diabetes, high cholesterol, dietary choices in the state of disease and losing weight were the main themes discussed during the show.

This call-in show introduced a new relationship between health professionals and their patients, creating a new avenue for knowledge exchange and allowing for mass communication of simple health messaging in a community where one-on-one medical advice often happens only in the case of an emergency or dire health concern. This is a very promising avenue for public health initiatives in Inuit communities.

4.5 LIMITATIONS

The limitations of community work are various because it is not a controlled environment. During the timeframe of this study, the Pangnirtung community faced many difficult circumstances including illnesses and deaths. During these times the community radio drama intervention was put on hold out of respect for the community. This led to delays in on-air programming, in the collection of pre- and post-intervention surveys and in scheduled Community Steering Committee meetings. These delays were deemed necessary by study investigators, and are indicative of the broad challenges facing public health promotion and research in the North.

Sample recruitment and sample size was a limitation of this study. Unfortunately, community records at health centers and schools are not up-to-date and therefore do not provide an accurate methods of SRS recruitment. Sample size was small and was limited by the size of the community (total population of 1325 [116]), and by the willingness of community members to complete a survey. There is significant research burden amongst the Canadian Inuit and general feeling that individuals are tired of being surveyed.

Underreporting in dietary intake is a concern with dietary recall analysis, especially when asked to report consumption of food or beverage (such as soft drink) with a negative connotation. Additionally, 24 hour recall, used to assess dietary consumption for relevant foods and beverages, does not give accurate insight into habitual dietary patterns. However, 24 hour recall was the most appropriate tool for this study due to time constraints and budgetary restrictions for hiring highly trained surveyors. It is also important to note that seasonality is a significant limitation of diet evaluation in northern Canada. Migration patterns of animal food sources and availability of plant species vary significantly during the year [51] and therefore reflect on dietary recall surveys (in our case, pre- and post-surveys) taken during different seasons.

4.6 CONCLUSIONS

The radio drama health intervention pilot in Pangnirtung, NU, presents interesting and promising results for further study in health education in Inuit communities. Significant knowledge gain within our study population from Elder teachings in the radio dramas prove that Elders continue to be effective educators amongst Inuit youth. Additionally, the decrease in soft drink consumption amongst those youth exposed to the radio dramas, although not significant, prompts further study into the Extended Elaboration Likelihood Model (EELM) to inform radio drama health interventions in Inuit communities. Overall, this demonstrates the importance of the theory-informed health interventions and results produce strong support for a full-scale intervention of this radio drama health intervention pilot.

TABLES

Table 4: Descriptive table of study population, Pangnirtung NU Youth, at baseline: 2010-2011.

	Pre-survey n=34 (post-survey n=30)	Mean (SD)[1]
Age (in yrs)	34 (30)	21.6 (2.8)
Sex		
male	14 (13)	41%
Education and Employment		
in school	4 (6)	12%
working	13 (11)	38%
unemployed & not in school	19 (17)	56%
Not in school, last grade completed	27 (22)	10.26 (1.32)
Physical Activity (past day)		
yes	33 (29)	97%
CF Previous Day		
yes	21 (14)	62%
Times per week consume CF	27 (24)	3.40 (1.78)
Full meals per day	34 (30)	2.47 (0.74)
Snacks per day	29 (29)	2.91 (1.04)
Cans soft drink previous day	34 (29)	2.62 (1.96)
Drink soft drinks with/without food		
by itself	2 (1)	0.06
with food	12 (8)	0.36
with and without food	19 (20)	0.58
Consumed milk previous day (yes)	6 (7)	0.18
Consumed water previous day (yes)	19 (19)	0.56
Consumed coffee/tea previous day (yes)	25 (20)	0.74
Friends drink soft drinks		
all or most	30 (23)	88%
some or none	2 (6)	6%
Parents drink soft drinks		
yes	24 (21)	75%
Youth heard/discussed radio drama		
yes	13	

[1]Unless otherwise noted, then x ± (SD)

Table 5: Paired Student's t-test, Pre-Survey vs. Post-Survey, Pangnirtung NU Youth: 2010-2011.

	n (Completed question in both pre- and post-survey, 'Paired')	Mean Difference (SE)	P-value
Times per week consume CF	19	-1.29 (0.45)	0.005
Full meals per day	30	-0.23 (0.17)	0.09
Snacks per day	24	0.15 (0.31)	0.64
Cans soft drink previous day	29	0.15 (0.49)	0.76

Table 6: Paired Student's t-test, Pre-Survey vs. Post-Survey, for correct answer choice (correct answer=1, incorrect answer=0) in knowledge questions, Pangnirtung NU Youth: 2010-2011.

Question		n	Mean (SD)	P-value
"How much sugar is in one can of soft drink?" ***(multiple choice)***	**PRE-survey**	26	0.65 (0.49)	
	POST-survey	26	0.58 (0.50)	0.57
	difference (SE)		0.08 (0.13)	
"What is the Inuttitut word for eating only enough until you are full (moderation)?" ***(fill in the blank)***	**PRE-survey**	30	0.37 (0.49)	
	POST-survey	30	0.63 (0.49)	0.03
	difference (SE)		0.27 (0.12)	

Table 7: Independent two-sample t-test, POST-Survey data mean (SD), 95% confidence interval, and p-value of variables 'cans soft drink consumed previous day' and 'CF consumption times per week' analyzed with variable 'if youth household played radio show (yes or no)', Pangnirtung NU Youth: 2010-2011.

		Cans soft drink consumed previous day				CF consumption, times per week			
		(n)	Mean (SD)	95% CI	P-value	(n)	Mean (SD)	95% CI	P-value
Youth heard/ discussed radio drama	(0) no	16	3.46 (2.97)	1.88-5.05		12	2.17 (1.78)	1.04, 3.29	
	(1) yes	12	2.16 (1.48)	1.22-3.11	0.09[#]	11	2.82 (1.38)	1.89, 3.75	0.34
	difference (SE)		1.30 (0.94)	-3.86			-0.65 (0.67)	-2.04, 0.74	

[#] one-sided p-value

Table 8: Independent two-sample t-test, POST-Survey data comparing independent variables (sex, parents' soft drink intake, CF previous day) on dependant variable youth consumption of 'cans of soft drink consumed previous day', Pangnirtung NU Youth: 2010-2011

		n	Mean (SD)	P-value
Sex	(f) female	17	2.62 (1.92)	
	(m) male	12	3.25 (3.13)	0.51
	difference (SE)		-0.63 (0.94)	
Parents consume soft drinks	(0) no	8	2.75 (1.25)	
	(1) yes	20	2.48 (1.94)	0.72
	difference (SE)		0.28 (0.75)	
CF previous day	(0) no	14	3.29 (1.82)	
	(1) yes	14	2.47 (3.06)	0.4
	difference (SE)		0.82 (0.95)	

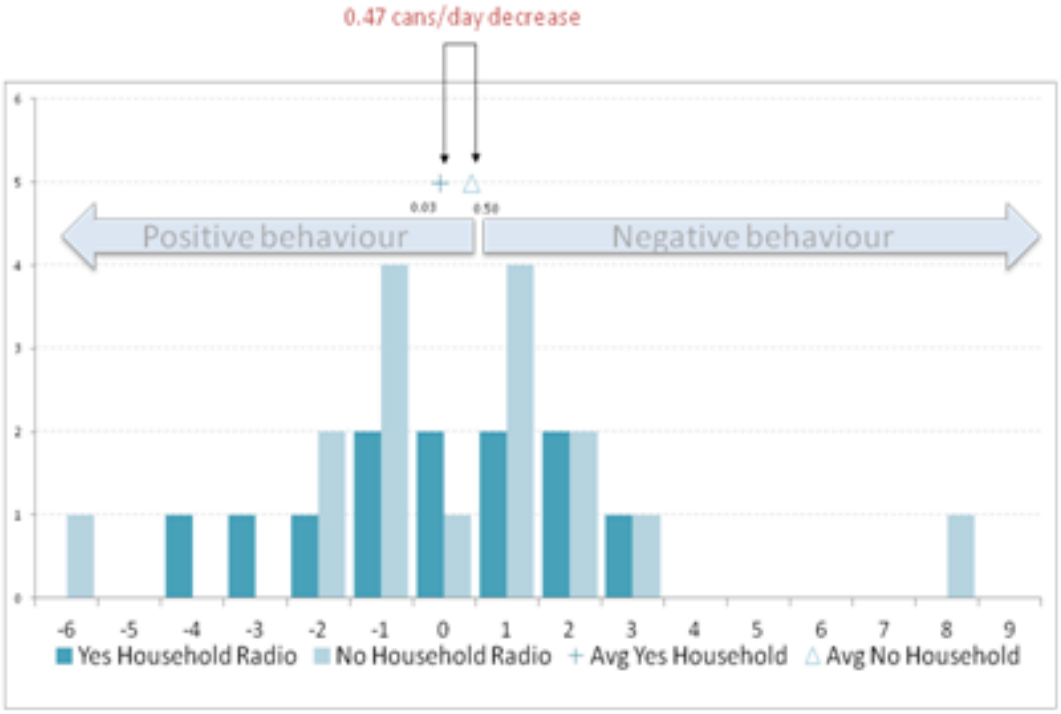
Table 9: Linear regression analysis, POST-Survey coefficients(SE) and p-value of demographic variables for predicting 'cans of soft drink consumed in previous day', Pangnirtung NU Youth: 2010-2011.

SINGLE-VARIABLE REGRESSION		Co-efficient (SE)	P-value
Sex	(0) male (1) female	-0.63 (0.94)	0.51
Age (y)	continuous	0.24 (0.15)	0.13
#Times CF/week	continuous	-0.24 (0.23)	0.32
#Meals/day	continuous	0.37 (0.74)	0.62
#Snacks/day	continuous	0.97 (0.34)	$\leq$0.01
Consumed milk previous day	(0) no (1) yes	1.85 (1.03)	0.08
Youth heard/discussed radio drama	(0) no (1) yes	-1.30 (0.94)	0.18

Table 10: Multivariable regression analysis, predicting 'cans of soft drink consumed in previous day' in the POST-Survey, Pangnirtung NU Youth: 2010-2011.

	MULTIVARIABLE REGRESSION		Co-efficient (SE)	Adjusted Co-efficient	P-value
Model #1	**Sex**	(0) male (1) female	-0.57 (0.95)	-0.12	0.56
	Youth heard/discussed radio drama	(0) no (1) yes	-1.29 (0.95)	-0.26	0.19
Model #2	**Consumed milk previous day**	(0) no (1) yes	2.09 (1.08)	0.35	0.06
	Youth heard/discussed radio drama	(0) no (1) yes	-1.13 (0.9)	-0.23	0.22
Model #3	**Age (y)**	continuous	0.28 (0.15)	0.34	0.08
	Youth heard/discussed radio drama	(0) no (1) yes	-1.42 (0.90)	-0.29	0.13
Model #4	**Number snacks consumed per day**	continuous	0.90 (0.35)	0.45	0.02
	Youth heard/discussed radio drama	(0) no (1) yes	-1.00 (0.89)	-0.20	0.27

Figure 2: Change score, Difference in Pre- and Post-Survey soft drink intake between youth whose households played the radio dramas and those that did not, Pangnirtung NU Youth: 2010-2011



CHAPTER V: Final Discussion and Conclusions

Inuit culture is currently undergoing a great transition, acculturation, globalization and climate change are all thought to be factors for this change [12, 18, 20]. The negative effects of this transition include increasing rates of obesity and chronic disease which are linked most specifically to the nutrition transition; the movement away from traditional foods and towards 'southern foods' high in saturated fats, refined carbohydrates and low in fibre [14, 20, 37].

It is a challenge to properly convey messages of health and nutrition that are both culturally and contextually appropriate for Indigenous communities. Inuit communities, in particular, are remote and language and cultural differences can hinder health communication. However, health promotion that is based upon existing frameworks of knowledge and theory looks to provide an effective starting point for health education and communication [3]. Radio has been identified as an important medium for communication in Inuit communities, used for local and national news as well as music. Until now, radio use for health promotion in Inuit communities was generally unevaluated, although international health programs had found success using radio drama [5-7].

It is important that health education be rooted in theory [2]. The Extended Elaboration Likelihood Model (EELM) caters to entertainment-based health education such as radio, and focuses on specific characteristics most likely to result in a successful intervention, including; storyline appeal, unobtrusive persuasive subtext, quality of production, and ability for audience to relate. EELM theory promotes behaviour change by eliciting central attitude change through self-engagement in the radio dramas.

Overall, the EELM was simple to use for the development as well as evaluation of a radio drama health intervention in an Inuit community. Results from the

intervention were promising in proving EELM and radio dramas effective in an Inuit community setting. Feedback from the communities was positive and supported the use of a Participatory Process in which the community was involved in all aspects of the health program; creation, implementation and evaluation. This program helped to build community capacity by equipping individual community members with the tools to create, implement and evaluate their own health education programming. Additionally, due to the community adoption of the program because of its cultural relevance, the town of Pangnirtung is now open to radio as a new medium for professional health information-exchange.

This is a promising step forward in the creation of culturally-relevant and respectful health promotion programming in Canadian Inuit communities. It is important to note that Aboriginal communities have needs and specific requirements differing from other culture groups in Canada. Radio was an appropriate avenue for communication in the case of this study because it is central to life in Canada's North. This may be also true on a global scale in the case of less developed countries or regions that still depend on radio as primary source for communication and information dissemination. Perhaps health interventions relying on radio would not be appropriate for other populations. But the theory-informed framework that this study is based upon would certainly be applicable. Results from this study prove the effectiveness of theory-informed public health interventions and add more evidence to support the partnership between educational psychology and traditional health experts.

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APPENDICES

Appendices 1: Radio Drama Scripts, Pangnirtung, NU, 2010-2011

Radio Drama: Country Food Lessons to Decrease Soft Drink Consumption
Pangnirtung, NU

Drama #1: Moderation (5:29min)
Student 1:
When it comes to our health it is important to understand piluajjaiqsimaniq. Some foods and drinks are okay for us to have but only in small amounts.

We have to be very careful how much we eat or drink.
Pop is an example of one of these foods.

Too much pop can lead to serious health problems including weight gain, cavities in our teeth, problems sleeping and problems concentrating at school or work.

Let's listen to a story told by *Josaphee Kenainak* who talks about country food and how it affects his life.

Josaphee explains the traditions of country food, the importance of country food in our culture, and eating certain foods in piluajjaiqsimaniq.

ELDER STORY = Josaphee Kenainak

Student 1:
In his story, *Josaphee Kenainak* talks about eating certain country foods only in piluajjaiqsimaniq, the example that he uses is Mattaaq.

We can use this knowledge that Josaphee teaches us to be careful about how much pop we drink.

A little bit once and awhile is not bad, but if we drink too much pop too often, it can make us unhealthy, just like eating too much Mattaaq.

We hope that you have enjoyed our message today and thank you for listening.

Student 2: Let's all try to replace one can of pop each day with one glass of water. Together we can try to keep our bodies stronger and healthier!

Drama #2: Pop Facts (2:22min)

Student 1: Hi, today we are going to share a few facts about pop. It is important to learn these facts so that you can help keep your body healthy and strong.

Student 2: Let's start with this...Did you know that in Pangnirtung we drink about one litre of pop PER DAY?

Student 1: Really? That can't be healthy for us.

Student 2: No, it really isn't. Pop has a lot of sugar in it, and drinking 1 litre of pop every day is like eating 36 teaspoons of sugar! Too much sugar is not good for us and can cause weight gain and this can even lead to diabetes. Too much sugar can also cause us to get cavities in our teeth. If we get too many cavities then our teeth will not be strong.

Student 1: Sometimes when I drink pop I feel really active and in school it is hard for me to sit in my seat for a long time and concentrate. Why do I feel like this?

Student 2: That's because pop also has something in it called caffeine. This is another ingredient that is not healthy for us if we drink too much. Too much caffeine can make it hard for us to sleep at night and hard to concentrate during the day at school and at work. It makes us feel like we can't sit still.

Student 1: Pop is also really expensive isn't it?

Student 2: Yeah, here in Pangnirtung each pop costs $2.00, if we drink 3 cans of pop per day, it would equal $2190.00 for the entire year! We could save a lot of money if we replaced even some of the pop that we drink with water.

Student 1: Thank you for listening today. We hope that if you can remember just one of these facts and it helps you to decrease the amount of pop that you drink, then it will help your body to be healthy, keep your teeth strong, and keep a little more money in your pocket!

Student 2: Let's all try to replace one can of pop each day with one glass of water. Together we can try to keep our bodies stronger and healthier!

Drama #3: Strong Bones (1:01min)

Youth A: Hi Julie, how are you?

Youth B: Good, just heading out to get some groceries. I'm going to try to follow the advice of our health education teacher and get some foods other than chips, chocolate and those microwave meals! We need to make sure that we eat all kinds of different foods to keep our body healthy.

Youth A: Definitely, like fruits and vegetables, and meats, and we also need to eat breads once and a while too.

Youth B: Yep, all those are right, but you are missing something else that is really important. It's dairy! Dairy includes foods such as yogurt, cheese, milk and Yop. These foods are very important because they help to build strong bones.

Youth A: So this means that we need to make sure to drink more milk and yogurt?

Youth B: Exactly, we do need to drink more milk. But this is very hard to do if we drink a lot of pop, because when we drink a lot of pop, we don't have any room for healthier drinks like milk that make our bones strong.

Youth A: So we need to drink less pop so that we have more room for milk and yogurt?

Youth B: Yes, that's right. Drinks that are made of dairy products help us keep our bones strong and healthy.

Youth A: Alright, well have fun shopping and I'll see you tomorrow!

Youth B: See you then!

Youth A: Let's all try to replace one can of pop each day with one glass of water. Together we can try to keep our bodies stronger and healthier!

Show #4: Market foods and Traditional Food (24:04min)

Youth A: First we are going to listen to a story by **Annie Maniapik**. In this story **Annie Maniapik** talks about how traditional foods are good for our bodies. Try to figure out why this might be while you are listening to the story and we will talk about this later on in the show.

STORY: Annie Maniapik

Youth A: Did you have any ideas about why traditional food is so good for our bodies? One reason for this is because traditional foods are very high in protein. Foods such as caribou and arctic char are very high in protein and are very lean, meaning that they have very little fat. It takes a long time for our stomach and intestines to digest protein, so we feel full for a long time, longer then if we were to eat white pasta or white bread. This could help us to eat less and eat less often.

Youth A: Pop is an example of a market food drink that is very high in sugar and doesn't keep us full for very long. It's not very good for our bodies. If we drink a lot of pop then we end up taking a lot of sugar into our bodies. When we have high amounts of sugar in our diet it can cause cavities in our teeth and may even cause us to gain weight.

Youth A: So let's all try to replace one can of pop each day with one glass of water. Together we can try to keep our bodies stronger and healthier!

Show #5: Replacing Pop with Milk and Water (0:53min)

Youth A: When we drink a lot of pop during the day, we are quenching our thirst with sugary drinks rather than water or milk. When we don't drink milk we may not get the proper amount of calcium and vitamin D and these nutrients help to keep our bones strong. Water helps to keep our body systems running smoothly and is a calorie-free drink! That means that we can't gain weight from drinking water – even when we drink as much as we want!

Youth A: So let's all try to replace one can of pop each day with one glass of water. Together we can try to keep our bodies stronger and healthier!

Show #6: Recipe for a Country-Berry Smoothie (live on air)

Youth A: We've been learning a lot lately about how drinking too much pop is not very good for us. There are many alternatives to pop, including milk, tea, pure fruit juices and most importantly, water. But here is a recipe for another great drink to have instead of pop, and best of all, it's made from the blackberries that we are collecting right now during the fall. Here it is - it's really simple!

Add 100% pure orange juice, ice and blackberries into a blender, blend and then pour into cups.

So again, that's just 100% pure orange juice, ice and blackberries! You can make it a creamy smoothie by replacing just the orange juice with milk. And you can add other berries, such as blueberries and cranberries to change the flavour.

The great part about this drink is that you don't have to add any sugar at all since the orange juice and berries are already sweet. And this blackberry smoothie provides many nutrients like vitamin C and fibre – all the nutrients in our sweet fall berries. Berry picking is an important event in the fall and this is just one more way to enjoy those berries that we've been waiting for all summer!

I hope you enjoy this new recipe and thank you for listening. So for now, let's all try to replace one can of pop each day with one glass of water. Together we can try to keep our bodies stronger and healthier!

Appendices 2: Focus Group Participant Information Letter (age 18+), Pangnirtung NU, 2010-2011

Focus Group: Information Letter
Radio Drama for Health and Nutrition Education

Welcome,

Today we are asking you to take part in a study to determine the best way to teach people about health and nutrition. This study has been formed and is being run through the collaboration of researchers at McGill University and Pangnirtung Steering Committee (Pangnirtung, NU, residents). This study has been approved by the McGill University Ethics Board, the Pangnirtung Hamlet, and the Pangnirtung Steering Committee.

The reason that this study is being conducted is to better understand how to teach people to make healthier choices when choosing food to eat. Residents of Pangnirtung have told us that they would like to see more information about choosing healthy foods. Because of this, we are working on creating radio dramas that talk about health and nutrition. We would like your input about what you think of certain foods and the radio dramas that we have created. We want to share your ideas and publish them in reports so that there is more information available to people about taking care of their health and healthy eating.

To be involved in this study we will ask you to be a part of a discussion group, or "focus group". The project coordinator will ask you a few questions about what you think about healthy eating and then ask you to listen to 2 radio dramas and share how you feel. The group discussion will be recorded and then written down (transcribed) afterwards.

You can decide at anytime not to be involved in the study. Even if you already said you would be involved, you can change your mind at any time. Any results from this focus group will be anonymous so if you agree to be part of this discussion group, we want you to know that we will NOT put any names (of yourself or any others) in reports. We will also make sure to not include any information that you give us that might help other people guess who was speaking. No one will be able to find out what you have said because we will be writing codes on the recordings and transcripts (papers) rather than names of people in the discussion group. The recordings will be kept secure and only Dr. Grace Egeland (McGill University) and those who she chooses under her supervision will have access to them.

If you would like to be a part of this study, please fill out the consent form attached and hand it back to the project coordinator.

Thank you for your time and interest,
Cassandra Racicot-Matta
[Facilitator, MSc. Candidate – McGill University]

Appendices 3: Focus Group Participant Consent Form (age 18+), Pangnirtung NU, 2010-2011

Focus Group PARTICIPANT CONSENT FORM
Radio Drama for Health and Nutrition Education

Please read thoroughly and if you have any questions please ask the facilitator (Cassandra Racicot-Matta)

PURPOSE

The goal of this study is to determine the best way to teach people about health and nutrition. You are in one of two groups of Pangnirtung youth that will be discussing radio drama as a method for teaching health and nutrition education. This study was funded by _____.

If you choose to be involved in this study, we will ask you to take part in a discussion group, or "focus group", about your feelings towards food choices and the radio dramas that have been created for you to hear. We will ask you questions about:

1) Your feelings about pop and healthy eating
2) What you think about the radio dramas that you listened to

PRIVACY

The short survey that we ask you to fill out today will ask questions about your personal pop and food intake. You will not be required to put your name on the survey itself, and there will be no data asked that will link you to the answers that you give. The discussion that we have today will be recorded and then later written down (transcribed). To make sure that what you say stays private we will use codes for the recordings and on the papers (transcriptions) rather than names, so no one knows who was speaking or who was in the particular discussion group ("focus group"). The recordings and papers will be available only to Dr. Grace Egeland (McGill University) and those that she assigns to be involved with this study.

PAYMENT

We thank you for taking the time out of your day to be a part of this project. During the focus group we
will provide for you a snack as well as a $55 gift certificate that can be used at the Pangnirtung Co-op.

BENEFITS/RISKS

We are hoping that the information that you help provide us with will increase the amount of health and nutrition information available to youth in Pangnirtung. This information may benefit you directly and you will have had a major role in shaping the way that health and nutrition information is shared.

There is no known risk to being involved in this study. If any questions make you feel uncomfortable you do not have to answer. You can choose at anytime not to be a part of this study. This will not cause any problems if you choose not to be involved.

QUESTIONS/CONCERNS

You can ask any questions that you have either before or after the study discussion. If there are any other questions that you have, please do not hesitate to contact either myself (Cassandra Racicot-Matta) or Dr. Grace Egeland. Contact information is listed below.

Dr Grace Egeland	grace.egeland@mail.mcgill.ca
Cassandra Racicot-Matta	cassandra.racicot@mail.mcgill.ca In Pang (at the lodge): OR at:

Statement of Informed Consent

I have read and understand the information above. I have asked any questions that I have and the researcher has answered my questions. I understand that my child and I have a right to be involved or withdraw from the study at any time. I understand that measures of privacy will be taken with any published material and no names will ever be used without additional consent. I do not give up any legal rights by signing this form. I understand that I will be given a copy of this form for my own records.

I agree to take part in a focus group in duration of 1-2 hours. This discussion will be taped and then later typed (transcribed).

Name of Participant:_____

Mailing Address:_____

Telephone Number:_____

Signature:_____ Date: _____

Name of Investigator/Witness:_____

Signature:_____ Date: _____

Appendices 4: Focus Group Parental Information Letter (under 18 years), Pangnirtung NU, 2010-2011

Focus Group: Parental Information Letter
Radio Drama for Health and Nutrition Education

June 29th, 2009
Dear Parent/Guardian,
We are asking your child to take part in a study to determine the best way to teach people about health and nutrition. This study has been formed and is being run through the collaboration of researchers at McGill University and Pangnirtung Steering Committee (Pangnirtung, NU, residents). This study is being funded by McGill University and supporters of Dr. Egeland (McGill University), and has been approved by the McGill University Ethics Board, Pangnirtung Hamlet, and Pangnirtung Steering Committee.

The reason that this study is being conducted is to better understand how to teach people to make healthier choices when choosing food to eat. Residents of Pangnirtung have told us that they would like to see more information about choosing healthy foods. Because of this, we are working on creating radio dramas that talk about health and nutrition. We would like your child to tell us about what he/she thinks of certain foods and the radio dramas that we have created. We want to share his/her ideas and publish them in reports so that there is more information available to people about taking care of their health and healthy eating.

To be involved in this study we will ask your child to be a part of a discussion group, or "focus group". The project coordinator will ask him/her a few questions about what they think about healthy eating and then ask them to listen to 2 radio dramas and share how they feel. The group discussion will be recorded and then written down (transcribed) afterwards.

You and your child can decide at anytime not to be involved in the study. Even if you and your child already said he/she would be involved, you and your child can change your mind at any time. Your child's privacy is very important to us, and should your child agree to be part of this discussion group, we want you to know that we will NOT put any names (of your child or any others) in reports. We will also make sure to not include any information given to us that will help other people guess who was speaking. No one will be able to find out what you have said because we will be writing codes on the recordings and transcripts (papers) rather than names of people in the discussion group. The recordings will be kept secure and only Dr. Grace Egeland (McGill University) and those who she chooses under her supervision will have access to them.

If you would like your child to be a part of this study, please fill out the consent form attached and hand it back to the project coordinator.

Thank you so much for your time and interest.
Kindly,
Cassandra Racicot-Matta
[Facilitator, MSc. Candidate – McGill University]

Appendices 5: Focus Group Parental Consent Form (under 18 years), Pangnirtung NU, 2010-2011

Focus Group: PARENTAL CONSENT FORM
Radio Drama for Health and Nutrition Education

Please read thoroughly and if you have any questions please ask the facilitator (Cassandra Racicot-Matta)

PURPOSE
The goal of this study is to determine the best way to teach people about health and nutrition. Your child will be in one of two groups of Pangnirtung youth that will be discussing radio drama as a method for teaching health and nutrition education. This study was funded by McGill University and supporters of Dr. Egeland (McGill University). If your child in involved with this study, we will ask him/her to take part in a discussion group, or "focus group", about his/her feelings towards food choices and the radio dramas that have been created for you to hear. We will ask questions about:

1) His/her feelings about pop and healthy eating
2) What he/she think about the radio dramas that they listened to

This focus group will last 2 hours at the most and be held at place that is handy for you and your child.

PRIVACY
The short survey that we will ask your child to fill out will ask questions about their personal pop and food intake. Your child will not be required to put his/her name on the survey itself, and there will be no data asked that will link your child to the answers that they give. The discussion that we will have will be recorded and then later written down (transcribed). To make sure that what your child says stays private we will use codes for the recordings and on the papers (transcriptions) rather than names, so no one knows who was speaking or who was in the particular discussion group ("focus group"). The recordings and papers will be available only to Dr. Grace Egeland (McGill University) and those under her supervision that she assigns to be involved with this study.

PAYMENT
We want to thank your child for being involved in this project. During the focus group we will provide a snack as well as a $55 gift certificate that can be used at the Pangnirtung Co-op.

BENEFITS/RISKS
We are hoping that the information that your child helps provide us with will increase the amount of health and nutrition information available to youth in Pangnirtung. This information may benefit your children directly and they will have had a major role in shaping the way that health and nutrition information is shared.

There is no known risk to being involved in this study. If any questions make your child feel uncomfortable they do not have to answer. Your child can choose at anytime not to be a part of this study. This will not cause any problems if he/she chooses not to be involved.

QUESTIONS/CONCERNS

You and your child can ask any questions that you have either before or after the study discussion. If there are any other questions that you have, please do not hesitate to contact either myself (Cassandra Racicot-Matta) or Dr. Grace Egeland. Our contact information is listed below.

Dr Grace Egeland	grace.egeland@mail.mcgill.ca
Cassandra Racicot-Matta	cassandra.racicot@mail.mcgill.ca In Pang: at the Auyuittuq lodge OR at: 514-298-7765

Statement of Informed Consent

I have read and understand the information above. I have asked any questions that I have and the researcher has answered my questions. I understand that my child and I have a right to be involved or withdraw from the study at any time. I understand that measures of privacy will be taken with any published material and no names will ever be used without additional consent. I do not give up any legal rights by signing this form. I understand that I will be given a copy of this form for my own records.

I agree for my child to take part in a focus group in duration of 1-2 hours. This discussion will be taped and then later typed (transcribed).

Name of Child Participant:_____

Name of Parent/Legal guardian: _____

Parent/Legal guardian Mailing Address:_____

Parent/Legal guardian Telephone Number:_____
Signature (Parent/Legal guardian):_____ Date: _____

Name of Investigator/Witness:_____
Signature:_____ Date: _____

Appendices 6: Youth Focus Group Questionnaire, Pangnirtung NU, 2010-2011

AGE: **Circle: MALE / FEMALE**

QUESTION	ANSWER
Do you drink pop?	
How many pop do you drink on an average day?	
Do you drink milk, juice or water?	
How many glasses of MILK do you drink each day (1 cup for each bowl of cereal you have)?	
How many glasses of WATER do you drink each day?	
How many glasses of JUICE do you drink each day?	
Do you eat country food?	
How many times do you eat country food every week?	

Appendices 7: Structured Questions from Youth Focus Groups, Pangnirtung NU, 2010-2011

Structured Focus Group Questions

INTRODUCTION
A -Who I am, where I'm from
B-Read PREPARED INTRO and Read PURPOSE OF STUDY AND PATIENT RIGHTS:
c - Since we are recording please just try your best to talk only one at a time. This way it's easier to type out the discussion later!
D-INTRO Survey – please put YC at the top of paper if in Youth Council Group

Section #1: These first questions are about your personal views about country food and pop in your life, your friends lives and the Pangnirtung community.
Personal

1. What do you think about pop?
2. Do you like pop? How many of you like pop, how many do not like pop?
3. How much pop do you drink every day?
4. Would you rather have a) pop, b)Juice, c)milk, d)water?

Peers

5. Do your friends drink pop?
6. How much pop do you think they drink each day?

Community

7. What do you think about pop in Pang? How do you think it affects the community?
8. Why do you feel the way you do about how pop affects the community? (Why do you feel these ways?)

Section #2: We are now going play radio drama #1 and then afterwards ask some questions about what you thought.
After Radio Drama #1 is Played

9. What are your thoughts about Drama #1?
10. What did you learn from this drama?
11. What did you feel was the topic of this drama?

Section #3: We are now going play radio drama #2 and then afterwards ask some questions about what you thought.
After Radio Drama #2 is Played

12. What are your thoughts about Drama #2?
13. What did you learn from this drama?
14. What did you feel was the topic of this drama?

Section #4: These next questions are going to ask you to compare the two dramas that you heard and ask about other ways of learning health and nutrition education.

15. Overall, did you like or dislike the radio ads? Why?
16. Which radio drama did you like better?
    -Why?
17. Do you think that we should use elder stories when we are teaching people about health?
18. Does it make a difference in how much you remember if you listen to an elder tell their story about their own experiences? Why?
19. What is the best way for you to remember things that you have heard?
20. Which health information do you remember best?
21. Do you remember where you heard of it?
22.-Why do you think you remember this information and not other health information that you have heard?

23. What else can you say about the radio dramas?
    -What was GOOD about the radio dramas?
    -Was there anything that you think needs to be improved for the radio dramas?

24. Is there anything else that you guys want to say about pop consumption or healthy eating in Pang?

Appendices 8: Radio Intervention Pre-/Post-Survey Participant Consent Form, Pangnirtung, NU, 2010-2011

Youth Survey PARTICIPANT CONSENT FORM
For Youth Ages 18-26

Principal Investigator: Grace Egeland Ph.D., Centre for Indigenous Peoples' Nutrition and Environment (CINE), McGill University.
Responsible Institution: CINE, McGill University.
Steering Committee: Johnny Kuluguqtuq, Selina Kisa, Jonah Kilabuk, Markus Wilcke, Oleepika Nashalik,
Markus Wilcke.
Other collaborators: Looee Okalik, Inuit Tapiriit Kanatami.
Funding Organizations: Canadian Institutes of Health Research (CIHR).

PURPOSE
The goal of this study is to determine the best way to teach people about health and nutrition and diabetes prevention. The project was created and is guided by the Pangnirtung Steering Committee. If you choose to be involved in this study, we will ask you to take part in a very short survey about drinking pop and eating country food. Each survey will take about 10-15 minutes.

PRIVACY
The short survey that we ask you to fill out today will ask questions about your personal pop and food intake. You will not be required to put your name on the survey itself, and there will be no data asked that will link you to the answers that you give. Your name will be assigned a number, and from then on, the survey results will be only identified by number, no one will ever know it was you who answered the questions. The surveys will be available only to Dr. Grace Egeland (McGill University) and those that she assigns to be involved with this study.

PAYMENT
At the completion of these surveys, 4 names of youth who have participated will be drawn and each will receive an iPod Shuffle.

BENEFITS/RISKS
We are hoping that the information that you help provide us with will increase the amount of health and nutrition information available to youth in Pangnirtung. This information may benefit you directly and you will have had a major role in shaping the way that health and nutrition information is shared.
There are no risks associated with this study.
Your participation is completely voluntary. If any questions make you feel uncomfortable you do not have to answer. You can choose at anytime not to be a part of this study with no penalty.

QUESTIONS/CONCERNS
If you have any questions, please contact Johnny Kuluguqtuq at 473-2632.

Statement of Informed Consent

I have read and understand the information above. I have asked any questions that I have and the researcher has answered my questions. I understand that I have the right to be involved or withdraw from the study at any time. I understand that measures of privacy will be taken with any published material and no names will ever be used without additional consent. I do not give up any legal rights by signing this form. I understand that I will be given a copy of this form for my own records.

Name of
Participant:_____

Signature:_____ Date: _____

Name of Witness:_____

Signature:_____ Date: _____

Appendices 9: Radio Intervention Pre-/Post-Survey Parental Consent Form, Pangnirtung, NU, 2010-2011

Youth Survey PARENTAL CONSENT FORM
for Youth Ages 15-17

Principal Investigator: Grace Egeland Ph.D., Centre for Indigenous Peoples' Nutrition and Environment (CINE), McGill University.
Responsible Institution: CINE, McGill University.
Steering Committee: Johnny Kuluguqtuq, Selina Kisa, Jonah Kilabuk, Markus Wilcke, Oleepika Nashalik,
Markus Wilcke.
Other collaborators: Looee Okalik, Inuit Tapiriit Kanatami.
Funding Organizations: Canadian Institutes of Health Research (CIHR).

PURPOSE
The goal of this study is to determine the best way to teach people about health and nutrition and diabetes prevention. The project was created and is guided by the Pangnirtung Steering Committee. If you choose for your child to be involved in this study, we will ask hum/her to take part in a very short survey about drinking pop and eating country food. Each survey will take about 15-20 minutes.

PRIVACY
The short survey that we ask your child to fill out will ask questions about his/her personal pop and food intake. Your child's name will not be on the survey itself, and there will be no data asked that will link him/her to the answers that they give. Your child's name will be assigned a number, and from then on, the survey results will be only identified by number, no one will ever know it was your child who answered the questions. The surveys will be available only to Dr. Grace Egeland (McGill University) and those that she assigns to be involved with this study.

PAYMENT
At the completion of these surveys, 4 names of youth who have participated will be drawn and each will receive an iPod Shuffle.

BENEFITS/RISKS
We are hoping that the information that your child helps provide us with will increase the amount of health and nutrition information available to youth in Pangnirtung. This information may benefit your child directly and your child will have had a major role in shaping the way that health and nutrition information is shared.
There are no risks associated with this study.
Your child's participation is completely voluntary. If any questions make your child feel uncomfortable he/she does not have to answer. Your child can choose at anytime not to be a part of this study with no penalty.

QUESTIONS/CONCERNS

If you have any questions, please contact Markus Wilke or Selina Kisa.

Statement of Informed Consent

I have read and understand the information above. I have asked any questions that I have and the researcher has answered my questions. I understand that my child has the right to be involved or withdraw from the study at any time. I understand that measures of privacy will be taken with any published material and my child's name will never be used without additional consent. I do not give up any legal rights by signing this form. I understand that I will be given a copy of this form for my own records. My signature means that I have the legal authority to sign for this minor.

Name of Participant Guardian:_____

Signature:_____ Date: _____

Name of Witness:_____

Signature:_____ Date: _____

Appendices 10: Radio Intervention Pre-Survey, Pangnirtung, NU, 2010-2011

Pangnirtung Youth Pre-Survey
January 2010

Date:_____

Name: _____

Do you go by any other names (please write?:_____

Age: _____ Sex: FEMALE ☐ r MALE ☐

Phone Number: _____

Address: _____

Email:_____

SECTION 1 (please circle the appropriate answer or fill in the blanks)**:**

1. Are you still in school? YES / NO

2. If yes, what grade? _____

3. If no, what was the last grade you completed? _____

4. Do you work? YES / NO

5. If yes, Part time or Full time? PARTTIME / FULLTIME

	7. Which activities (check any)?	8. How many times in a week?
6. Do you take part in physical activity at least once a week? YES or NO	☐ Hunting ☐ Fishing ☐ Playing Outdoor Games ☐ Walking for 15 minutes ☐ Walking for 30 minutes ☐ Recreational Sports (road hockey) ☐ Competitive Sports (high school sports, Arctic Games, hockey team) ☐ Other: _____ _____	_____ _____ _____ _____ _____ _____ _____ _____

9. Did you eat any country food yesterday (midnight-to-midnight)?
YES or NO

10. List the country foods you ate:

_____

_____

11. Did you drink pop yesterday (midnight-to-midnight)? YES or NO

12. If yes, how many cans? _____

or how many glasses (if you poured it out of a big container)?__

SECTION TWO (please circle the appropriate answer or fill in the blanks)**:**

13. How many full meals do you have each day? _____

14. How many times do you have a snack each day? _____

15. Do you drink pop? YES or NO

16. How often do you drink pop?

- ☐ Every day, how many cans_____
- ☐ A few times per week, how many cans _____
- ☐ A few times per month, how many cans _____

17. Do you normally drink pop by itself or with food?

- ☐ BY ITSELF
- ☐ WITH FOOD
- ☐ WITH and WITHOUT FOOD

18. What time of the day do you MOST often drink pop?

☐ Morning ☐ Afternoon ☐ Dinner ☐ Late at Night

19. In the **PAST DAY** how much of other beverages did you drink?:		
Coffee or tea	_____ small glasses	_____large glasses
Water	_____ small glasses	_____large glasses
Milk	_____ small glasses	_____large glasses
Juice	_____ small glasses	_____large glasses

20. In the **PAST WEEK** how much of other beverages did you drink?:		
Coffee or tea	_____ small glasses	_____large glasses
Water	_____ small glasses	_____large glasses
Milk	_____ small glasses	_____large glasses
Juice	_____ small glasses	_____large glasses

21. How much sugar is in a can of pop (CIRCLE)?

a) 1 teaspoon b) 3 teaspoons c)6 teaspoons d)12 teaspoons

22. How much sugar is in a litre of pop?

a) 2teaspoon b)5 teaspoons c)36 teaspoons d)50 teaspoons

23. What is the traditional Inuit word for eating only enough until you are full (moderation)? _____

SECTION THREE (please circle the appropriate answer or fill in the blanks)**:**

24. Do you eat country food? YES or NO

25. How many times a week do you eat country food? _____

26. How many of your friends drink pop (circle)? ALL or MOST or SOME or NONE

27. If yes, how many cans of pop do they drink each day? ____

28. Do you and your friends drink pop together at the same time?

YES or SOMETIMES or NO

29. What do your friends think about pop?

_____

_____

_____

_____

30. Do your parents drink pop? YES or NO

31. Do you drink pop at the same time as your parents? YES or NO or SOMETIMES

32. How often? ☐ Daily ☐ Weekly ☐ Very rare

33. What do your parents think about pop?

_____

_____

_____

34. What is your favourite brand of pop? _____

35. Why is it your favourite brand (check any)?

☐ Way the Package looks ☐ Good Price

☐ Friends Drink it ☐ Convenient to buy

☐ Family Drinks it ☐ Other reason: _____

Appendices 11: Intervention Post-Survey, Pangnirtung, NU, 2010-2011

Pangnirtung Youth POST-Survey
October 2010

Date:_____

Name: _____

Do you go by any other names (please write?:_____

Age: _____ Sex: FEMALE ☐ or MALE ☐

Phone Number: _____

Address: _____

Email:_____

SECTION 1 (please circle the appropriate answer or fill in the blanks)**:**

1. Are you still in school? YES / NO

2. If yes, what grade? _____

3. If no, what was the last grade you completed? _____

4. Do you work? YES / NO

5. If yes, Part time or Full time? PARTTIME / FULLTIME

	7. Which activities (check any)?	8. How many times in a week?
6. Do you take part in physical activity at least once a week? YES or NO	☐ Hunting ☐ Fishing ☐ Playing Outdoor Games ☐ Walking for 15 minutes ☐ Walking for 30 minutes ☐ Recreational Sports (road hockey) ☐ Competitive Sports (high school sports, Arctic Games, hockey team) ☐ Other: _____	_____ _____ _____ _____ _____ _____ _____ _____

9. Did you eat any country food yesterday (midnight-to-midnight)?
YES or NO

10. List the country foods you ate:

_____

_____

11. Did you drink pop yesterday (midnight-to-midnight)? YES or NO

12. If yes, how many cans? _____

or how many glasses (if you poured it out of a big container)?__

SECTION TWO (please circle the appropriate answer or fill in the blanks)**:**

13. How many full meals do you have each day? _____

14. How many times do you have a snack each day? _____

15. Do you drink pop? YES or NO

16. How often do you drink pop?

- ☐ Every day, how many cans_____
- ☐ A few times per week, how many cans _____
- ☐ A few times per month, how many cans _____

17. Do you normally drink pop by itself or with food?

- ☐ BY ITSELF
- ☐ WITH FOOD
- ☐ WITH and WITHOUT FOOD

18. What time of the day do you MOST often drink pop?

☐ Morning ☐ Afternoon ☐ Dinner ☐ Late at Night

19. In the **PAST DAY** how much of other beverages did you drink?:		
Coffee or tea	_____ small glasses	_____large glasses
Water	_____ small glasses	_____large glasses
Milk	_____ small glasses	_____large glasses
Juice	_____ small glasses	_____large glasses

20. In the **PAST WEEK** how much of other beverages did you drink?:		
Coffee or tea	_____ small glasses	_____large glasses
Water	_____ small glasses	_____large glasses
Milk	_____ small glasses	_____large glasses
Juice	_____ small glasses	_____large glasses

21. How much sugar is in a can of pop (CIRCLE)?

a) 1 teaspoon b) 3 teaspoons c)6 teaspoons d)12 teaspoons

22. How much sugar is in a litre of pop?

a) 2teaspoon b)5 teaspoons c)36 teaspoons d)50 teaspoons

23. What is the traditional Inuit word for eating only enough until you are full (moderation)? _____

SECTION THREE (please circle the appropriate answer or fill in the blanks)**:**

24. Do you eat country food? YES or NO

25. How many times a week do you eat country food? _____

26. How many of your friends drink pop (circle)? ALL or MOST or SOME or NONE

27. If yes, how many cans of pop do they drink each day? ____

28. Do you and your friends drink pop together at the same time? YES or SOMETIMES or NO

29. What do your friends think about pop?

_____

_____

_____

30. Do your parents drink pop? YES or NO

31. Do you drink pop at the same time as your parents? YES or NO or SOMETIMES

32. How often? ☐ Daily ☐ Weekly ☐ Very rare

33. What do your parents think about pop?

_____

_____

_____

34. What is your favourite brand of pop? _____

35. Why is it your favourite brand (check any)?

☐ Way the Package looks
☐ Friends Drink it
☐ Family Drinks it
☐ Good Price
☐ Convenient to buy
☐ Other reason: _____

SECTION FOUR (please check/circle the appropriate answer or fill in the blanks)**:**

36. Have you heard about the Youth Radio Drama Show playing on the radio in Pang: YES or NO

37. From who?

☐ Mother	☐ Grandmother	☐ Sister	☐ Girlfriend	☐ Friend
☐ Father	☐ Grandfather	☐ Brother	☐ Boyfriend	☐ Spouse

38. Did you listen to the Youth Radio Drama Show yourself? YES or No

39. Were you sitting with family when you heard the show playing or by yourself?

WITH FAMILY or BY SELF

40. What do you remember most about the Youth Radio Drama shows?

_____

_____

41. Did you like the Youth Radio Drama Show? YES or No

42. What did you like or not like about the drama show?

_____

_____

_____

43. Do you have any ideas about how to teach youth about pop and the bad effects that it can have?

_____

_____

_____