

A Demonstration Project to Evaluate a Traditional-style Diet for Obesity

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Background

- Obesity is a major health problem in Canada
- Obesity is associated with type 2 diabetes, impaired glucose tolerance and the metabolic syndrome
- Among aboriginal populations, diabetes is 5 times more prevalent than in the Caucasian population
- For example, 40% of Oji-Cree had evidence of type 2 diabetes or glucose intolerance

First Nations Traditional Diet

- The pre-contact diet of Canadian West Coast First Nations peoples consisted of game, fish, seafood, marine lipids and edible wild plants
- This traditional diet resembles the modern “low carbohydrate ketogenic diet,” shown to be effective for obesity treatment among non-First Nations populations
- Recent intensive efforts using current dietary guidelines have yielded only modest results for the treatment of obesity and type 2 diabetes among Canadian First Nations

Study Purpose

Using traditional foods along with modern foods of similar macronutrient value, the purpose of this project was to develop and evaluate the effectiveness of a traditional diet intervention in treating obesity in a First Nations population over one year.

Inclusion/exclusion criteria

Inclusion criteria:

- Type 2 diabetes
- Elevated risk for T2DM (MetS, relative with T2DM)
- Desire to lose weight
- Desire to improve T2DM control

Exclusion criteria:

- any unstable medical condition (eg. abnormal kidney or liver function, unstable angina)
- Pregnancy or lactation

Intervention

- Local medical clinic staff received training in how to instruct patients on the diet using a handout listing allowable foods, how to manage side-effects and how to reduce medications if needed
- Community support from PI, including monthly visits to the community and medical clinic
- After a comprehensive baseline evaluation, patients were instructed to follow a traditional diet, and then to return for follow-up visits after 2, 4, 12, 24 and 52 weeks, or more frequently if clinically indicated

Traditional Diet Program Handout

The traditional or pre-contact diet of First Nations peoples consisted of fish, meat, wild plants and berries. The Traditional Diet Program uses selected modern foods in groupings similar to what people ate before contact. It is designed to treat overweight and obesity, metabolic syndrome and diabetes.

Caution: *If you are taking insulin or any other medication for diabetes, blood pressure or cholesterol your need for these medications will drop rapidly and you may become ill if you continue to take them after starting the diet.*

IF YOU ARE TAKING THESE KINDS OF MEDICATIONS YOU SHOULD SEEK THE SUPERVISION OF A PHYSICIAN BEFORE STARTING THIS DIET SO THAT YOUR MEDICATIONS CAN BE WITHDRAWN AS YOUR NEED FOR THEM DIMINISHES.

EAT AS MUCH AS YOU WISH OF THE FOLLOWING FOODS:

Meat: *beef, lamb, veal, pork, ham, bacon or any game meat (rabbit, moose, venison)*

Poultry: *chicken, turkey, duck, pheasant or other game birds*

Seafood: *any fish or shellfish including but not limited to salmon, halibut, cod, oolichan, crab, prawns, clams, oysters, mussels, squid, octopus, any smoked, dried or plain canned fish or seafood (not cured with sugar), roe and roe-on-kelp*

Eggs: *whole eggs (do not eat whites without yolks)*

LIMIT THESE FOODS UNTIL THE DIABETES IS IMPROVED OR ELIMINATED:

Salad Greens: 2 cups a day.

Any leafy vegetable including lettuce or other salad greens, parsley, spinach, the tops of green onions, sprouts, fiddleheads, seaweed. (If it is a leaf—you can eat it.)

Vegetables: 1 cup (measured uncooked) a day.

Vegetables that grow above the ground, including asparagus, beet greens, bokchoy, broccoli, brussel sprouts, cabbage, cauliflower, celery, chard, Chinese cabbage, cucumber, eggplant, green beans, kale, leeks, mushrooms, peppers, spinach, string beans, squash, tomatoes, turnips, wax beans and zucchini.

YOU MUST EAT VEGETABLES EVERY DAY.

Cheese: 4 ounces a day.

Includes hard, aged cheeses such as Swiss, cheddar, mozzarella, Monterey jack, Gruyere, goat cheese, bleu, feta and soft cheeses such as cream cheese, brie and camembert. Avoid processed cheeses, cheese spreads or cheese foods such as Velveeta.

Fresh cheese: 0 ounces a day (while on induction phase).

Includes cottage cheese, farmers cheese, ricotta and tofu.

Study Procedures

- Subjects were recruited from the community through public meetings, notices in health centres and by word-of-mouth
- Subjects were followed by the regular clinic physician and a study nurse (recruited locally)
- Medical staff were trained in the study protocol but otherwise had no prior experience using this approach
- 86 subjects enrolled from August-December 2006
- Follow-up laboratory tests were performed within 1 month of longest length of follow-up

Results

Baseline Characteristics

Characteristic	Mean (SD) or n% (n=40)
Age, years	52.1 (9.5)
Gender, female	27 (67.5%)
Race, First Nations	22 (55%)
Body weight, kg	97.2 (15.2)
Body mass index, kg/m ²	37.2 (7.2)
Diagnosis of diabetes	7 (17.5%)

Effect on Weight and Body Composition

Variable	Baseline mean	Follow-up mean	Change from Baseline	P value
Weight, kg	97.2 (15.2)	87.1 (13.1)	-10.1%	<0.0001
Waist circ, cm	116.1 (15.1)	104.4 (11.9)	-9.7%	<0.0001
Hip circ, cm	120.5 (12.9)	112.0 (8.9)	-6.7%	<0.0001
Waist/Hip ratio	0.97 (0.07)	0.93 (0.77)	-3.1%	0.001
Systolic bp, mmHg	128.0 (15.4)	129.5 (17.9)	+1.6%	0.59
Diastolic bp, mmHg	80.2 (10.5)	79.7 (10.0)	+0.1%	0.98

n=40, mean length of follow-up = 7.6 months
Data presented are mean (standard deviation)

Measures

- Body weight measured on the same scale with light clothing only, shoes removed
- Abdominal and hip circumference were taken with a standard tape measure
- Laboratory tests performed by the local hospital lab

Statistical Analysis

For the outcomes of weight and laboratory tests, a paired t-test (pre-post) was used to assess whether the change from baseline to follow-up was different than 0

Results

Participant Flow

- At the time of analysis, 40 subjects (47%) had completed more than 4 months of the program (another 17 remained compliant, 29 had d/c diet)
- In this analysis of subjects who stayed in program for at least 4 months, the mean length of follow-up was 226.5 days (7.6 months)

Limitations

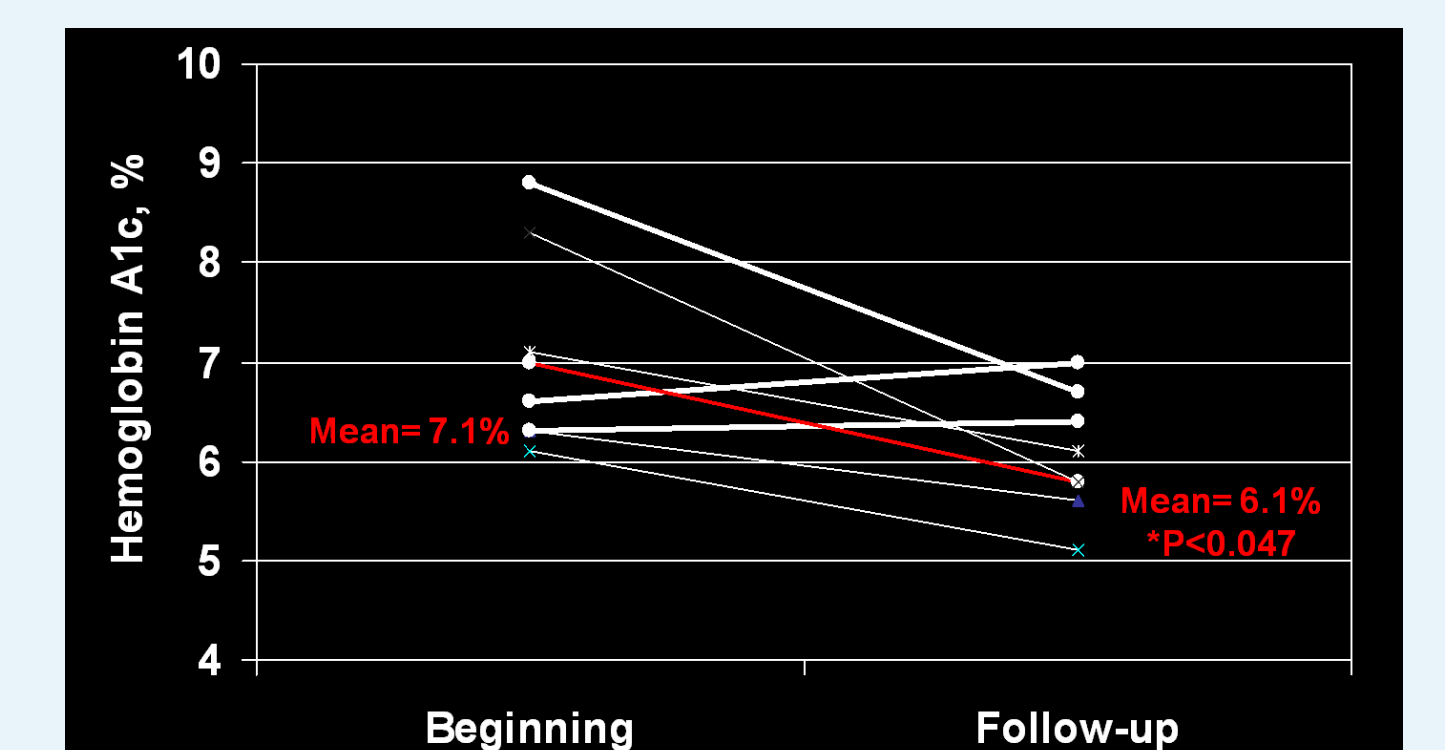
- Feasibility study
- Loss to follow-up
- While conducted in a First Nations community, only 55% of subjects were First Nations

Effect on Fasting Serum Lipids

Variable	Baseline mean	Follow-up mean	Change from Baseline	P value
TChol, mmol/L	5.51 (1.0)	5.55 (1.16)	+ 2.4 %	0.43
Triglyceride	1.24 (0.65)	0.86 (0.37)	- 19.9 %	0.0007
HDL	1.31 (0.37)	1.50 (0.44)	+ 17.4 %	<0.0001
LDL	3.64 (0.86)	3.66 (1.2)	+ 2.2%	0.48
Trig/HDL ratio	1.08 (0.78)	0.66 (0.42)	- 30.2 %	0.0002
Chol/HDL Ratio	4.56 (1.51)	3.92 (1.12)	- 11.5%	<0.0001

n=40, mean length of follow-up = 7.6 months
Data presented are mean (standard deviation)

Change in Hemoglobin A1c Among Patients with Type 2 Diabetes



*Red line is the group mean. P value is for the mean change from baseline.

Conclusions

- A lifestyle intervention tailored to the local traditional dietary intake is feasible using existing medical clinic staff
- Among completers, there were significant improvements from baseline in weight, type 2 diabetes, and parameters of the metabolic syndrome over a 7.6 month period
- This type of approach which tailors a lifestyle to the local heritage may be useful to reduce obesity, type 2 diabetes and metabolic syndrome, especially in disproportionately affected populations

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