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Waist size and lifestyle in Iiyiyiu children
Findings from the Emiyuu Ayayaachiit Awaash (Active Kids) Study[1]

Central adiposity and health

"Central adiposity" means that a person is carrying a lot of their weight around the waist. This does not always mean that they are overweight; it just describes how their weight is distributed. It is typically measured by waist circumference (girth at the belly-button level while the person is standing up).

There is mounting evidence that, whether or not you are overweight, a high waist circumference raises your risk of health problems. In particular, high waist circumference seems to go with high insulin levels and some of the other problems that make up "Metabolic Syndrome." (Metabolic Syndrome is a cluster of abnormalities that predicts increased risk for heart disease, stroke, and diabetes.) Some studies suggest that, among Aboriginal peoples, waist circumference is more useful than the standard measure of overweight—Body Mass Index—for predicting health risk.

Past studies have shown that children in many Aboriginal groups have high rates of obesity and central adiposity. This may raise their risk of developing Metabolic Syndrome, and eventually diabetes. This makes it important to find out what lifestyle habits are associated with high waist circumferences, and what can be done to prevent them. Since diabetes in Iiyiyiu Aschii often sets in at young ages, prevention has to start early. Accordingly, this study focused on central adiposity and what predicts it among children in grades 4–6. It looked at the children's waist circumferences and weight, and tried to relate these to their diet and activity levels.

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[1] This is a summary of a more technical report by Shauna M. Downs, Dru Marshall, Carmina Ng, and Noreen D. Willows (2008) entitled "Central adiposity and associated lifestyle risk factors in Cree children." The summary is intended for health workers and other community staff in Iiyiyiu Aschii. The original article can be found in the journal *Applied Physiology, Nutrition, and Metabolism*, 33: 476-482, or on the National Research Council's Research Press Web site at apnm.nrc.ca.

Study methods

The study took place in the fall of 2004 and 2005, using children enrolled in grades 4–6 at two schools in Iiyiyiu Aschii. Before it began, the project was discussed with band councils, with health staff, and with the schools. Radio broadcasts told community members about the study, and students were given information sheets and consent forms to take home to their parents. Of the 225 children in those grades, 208 got consent from their parents. Of these, 178 children (79%) completed all the parts of the study.

The study used these definitions:

Weight	The study used Body Mass Index (BMI —a measure of weight for height), and compared the Iiyiyiu children to US children of the same age and sex. (The comparison to American children is because the US publishes detailed data on children's height and weight at various ages.) Standard cut-off points were used: • Obese: any child with a BMI at or above the 95th percentile —that is, a child who weighs more than 95% of all children of the same age and sex. • Overweight: BMI between the 85th and 95th percentile. • Normal weight: BMI somewhere below the 85th percentile.
Central adiposity (waist circumference)	• High circumference: any child with a waist measurement greater than 85% of other children of the same age and sex. • Low/normal circumference: everyone else.
Physical activity	Students wore pedometers for two school days to measure how many steps they took in a day. Their total number of steps was compared to a standard that says that boys of this age should take at least 15,000 steps a day, and girls 12,000 steps.
Physical fitness	Fitness was measured by a shuttle-run test during gym class. The results were compared to those for other children in Quebec. The Iiyiyiu children's results were quite low as compared to other children, so any child who scored above the 20th percentile was classed as "fit." The rest were classed as "less fit."
Nutrition	Children completed three 24-hour food recalls, covering two weekdays and one weekend day. Using Health Canada data on the nutrient content of various foods, the child's caloric intake was then calculated. As well, the results were grouped by: • Fruit/vegetable consumption: Children eating 3 or more fruits or vegetables per day vs all the others. (Fruit juice was not counted.) • Fibre: children who got more fibre than 75% of Iiyiyiu children, vs all the rest. • Milk intake: children who got two cups of milk per day (as recommended by the Canada Food Guide) vs all the others. • Intake of sweetened drinks (powdered fruit drinks, sport drinks, non-diet pop): Children who drank less than 1 can per day vs those who drank one or more cans per day.

Results

Findings for all children (regardless of weight and waist circumference)

- A third of the children in this study were of normal weight-for-height (BMI), while the remainder were either overweight (24%) or obese (44%).
- About half the children (52%) had large waist circumferences.
- 59% of children walked as much as recommended for their age (15,000 steps for boys and 12,000 for girls). The rest walked less.
- Results on the shuttle-run test of physical fitness compared very poorly to those of other children in Quebec.
- Few children were eating six or more fruits and vegetables per day, as recommended by the Canada Food Guide. In fact, 84% of the children ate fewer than three fruits and vegetables each day.

Findings for children with large waist circumferences

The children with large waist circumferences tended to be whose who were overweight or obese; only 2.2% of the normal-weight children had high waist circumferences. The children who weighed a lot, and those with large waists, tended to do poorly in the shuttle run.

Focusing only on the children with large waist circumferences, statistical tests suggest that waist size is related to the number of sweet drinks a child consumes, and to his/her results on the shuttle-run test.

As compared to the normal-waist children, those with large waist measurements

- tended to be older, taller, and heavier;
- were more likely to be overweight or obese,
- ate fewer fruits and vegetables
- took fewer steps per day
- and had poorer results on the shuttle-run.

However, some of the variables that you would expect to be related to waist size did not reach statistical significance. For instance, the normal-waist children actually reported eating more calories per day, and drinking more sweet drinks, than the large-waist children. Some of this may be due to errors in how children report how much they eat. Past studies suggest that leaner children tend to over-report their food intake, while fatter ones tend to under-report it. Also, because children with a normal waist circumference took more steps per day and scored higher on the test of physical fitness, they may have needed more calories than the children with large waists.

Most of these variables —like eating few vegetables, being overweight, and walking less—tend to go together. The researchers used a statistical model (logistic regression) to look at which variables have an effect even when you separate them out from all the others. According to this model, the main variables associated with large waist size are how many fruits and vegetables a child eats, how much he or she walks, and how he or she does on the shuttle run. None of the other indicators of diet (like fibre, milk, high fat content, or consumption of sweet drinks) seemed to be significantly related to waist size. The small number of children included in the study might have prevented some statistical tests from reaching significance (that is, showing a definite pattern). For example, there was some tendency for children with normal waist size to drink more milk than children with large waists, but it did not reach statistical significance.

How could we prevent central adiposity in Iiyiyiu children?

Because this study took a "snapshot" at one point in time, it can tell us if two things are related, but it cannot tell us which one causes the other. For instance, we can say that children with large waist circumferences walk less than others, but we don't know if they have the large waists *because* they didn't walk much, or if they developed the large waist first, and find it harder to walk as a result. Nonetheless, the results point to some actions that might help keep waist size down.

First, since large waist sizes seem to be associated with more sweet drinks and fewer fruits and vegetables, it might help to modify children's diets. And since we notice that many children—especially those with large waists—are not very fit and are not walking much, it might be a good idea to promote vigorous physical activity. Studies show that being active controls weight, lowers blood pressure and levels of "bad" fats (triglycerides), raises levels of "good" cholesterol, and helps prevent some chronic diseases. There are also studies that show that activity helps decrease waist size in teenagers.

More broadly, the findings in Iiyiyiu Aschii have implications for other Aboriginal groups in Canada. If the Iiyiyiu findings are typical, then lots of Aboriginal children may be carrying a lot of their weight around the waist. This would place them at risk of developing the Metabolic Syndrome that precedes diabetes and some types of heart disease. Future studies in Aboriginal communities should measure waist circumference as well as Body Mass Index.