

## Metabolic abnormalities in obese teens may relate to poor diets

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Obese teens may feel healthy, but blood tests show they have inflammation, insulin resistance, and high homocysteine levels, researchers report at the American Heart Association's Nutrition, Physical Activity and Metabolism/Cardiovascular Disease Epidemiology and Prevention 2011 Scientific Sessions.

"The metabolic abnormalities suggest that the process of developing heart disease has already started in these children, making it critical for them to make definitive lifestyle and diet changes," said Ashutosh Lal, M.D., senior author of the study and a pediatric hematologist at the Children's Hospital and Research Center Oakland in California.

Researchers compared the diets and blood test results of 33 obese youthss (ages 11 to 19) with 19 age-matched youths of normal weight. Obesity in youths isa <u>body mass index</u> (BMI) higher than the 95th percentile of children the same age. Normal weight youths had a BMI below the 85th percentile. Body mass index is a measure of weight related to height. Two thirds of the participants in both groups were girls. All of the participants were receiving regular health maintenance care at an inner city clinic in Oakland.

Blood tests revealed that the obese teens had:

• C-reactive protein levels almost ten times higher than controls, indicating more inflammation in the body.



- <u>Insulin resistance</u>, a precursor to type 2 diabetes, with greater amounts of insulin needed to keep <u>blood sugar levels</u> normal.
- Homocysteine levels 62 percent higher than controls. High levels of the amino acid homocysteine are related to greater <u>heart</u> <u>disease risk</u>.
- Total glutathione levels 27.9 percent lower than controls, with oxidized glutathione levels 125 percent higher. A higher ratio of oxidized to non-oxidized glutathione indicates oxidative stress, an imbalance in the production of cell-damaging <u>free radicals</u> and the body's ability to neutralize them. Oxidative stress leads to more inflammation and an increase in blood vessel damage and stiffening.

"Looking at the numbers you would think these children might feel sick, but they did not," Lal said. "They are apparently feeling well, but there is a lot going on beneath the surface."

Dietary quality was poor in all the children – low in fresh produce, fiber, and dairy products. On questionnaires, obese and normal-weight children reported consuming similar amounts of grains, proteins, fats and total calories. However, the obese children reported significantly fewer servings of dairy products and tended towards fewer fruit servings. The obese children's diets were lower in potassium, vitamin C, vitamin D, and vitamin A, found in fortified dairy products and as well as in deeply colored fruits and vegetables.

With such poor dietary quality in both the obese and control groups, clinicians should pay more attention to what their young patients are eating, researchers said.



"Obese teens were consuming too few of the natural sources of antioxidants, fruits and vegetables, and may have increased antioxidant needs based on the inflammation associated with their extra adiposity" Lal said. "For their heart health, obese teens need to eat better, not just eat less."

Though the study's participants attended an inner city health clinic, researchers said the metabolic differences between obese and normal-weight teens would be found in all socioeconomic groups.

**More information:** The children in the study were racially diverse. The obese group was 39 percent African-American, 30 percent non-African-American Hispanic, 18 percent Caucasian and 6 percent Asian and 7 percent other. The control group was 21 percent African-American, 5 percent Hispanic, 42 percent Caucasian, 21 percent Asian and 11 percent other.

## Provided by American Heart Association

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