Intervention lowered obesity rate in youth at high diabetes risk, HEALTHY study finds

EurekAlert

An intervention in middle schools lowered the obesity rate in students at highest risk for type 2 diabetes, those who started out overweight or obese in sixth grade, an NIH-funded study has found. However, schools that implemented the program did not differ from comparison schools in the study's primary outcome—the prevalence of overweight and obesity combined—which had declined 4 percent in both groups of schools by the end of the three-year study.

The goal of the HEALTHY Study was to determine whether changes in school food services; longer, more intense periods of physical education; and classroom activities to promote behavior change would lower risk factors for type 2 diabetes. Conducted from the beginning of the sixth grade to the end of the eighth, the study involved 4,600 students attending 42 middle schools in seven areas of the country. Schools were randomly assigned to implement the program or serve as a comparison school.

"The study shows that a school-based program can help lower obesity and certain risk factors for type 2 diabetes in youth at high risk for the disease," said Griffin P. Rodgers, M.D., director of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).

Researchers were surprised to find that the number of overweight and obese students had declined in comparison schools as well as program schools. "The decline in the number of overweight and obese children in comparison schools was a welcome but unexpected finding," said study chair and lead author Gary D. Foster, Ph.D., of Temple University, Philadelphia. "Future analyses will try to clarify the reasons for the improvement in these schools. For example, we'll look at the comparison schools to see if they made healthy changes to the school environment because of increased awareness about the problem of childhood obesity."

The intervention significantly lowered the obesity rate among children whose body mass index, or BMI, was initially at the 85th percentile or more. In children, overweight is defined as a BMI at the 85th to 94th percentile for their age and sex; obesity is defined as a BMI at the 95th percentile or more. BMI is a measurement of weight in relation to height.

Students in program schools who were overweight or obese in the sixth grade had 21 percent lower odds of being obese by the end of the eighth grade compared with students in control schools. Nationally, about one-third of children are overweight or obese, but in schools participating in the study, half of students were overweight or obese in sixth grade.

"Decreasing the number of obese children can have profound effects on diabetes risk in young people, since obese youth are at greatest risk of metabolic abnormalities," Foster said.

At the end of the study, 35 percent of children in both intervention and comparison schools with a BMI in the 95th percentile or greater had high insulin readings, compared with 2 percent of students whose BMI was less than the 85th percentile.

The program also lowered average levels of fasting insulin and the number of students with a waist at or over the 90th percentile in students in intervention schools compared with comparison schools. A high blood level of insulin after an overnight fast and a large waist increase the risk of developing type 2 diabetes, independent of body weight. However, the two groups did not differ in mean glucose levels or the percentage of students with elevated fasting glucose. A higher-than-normal level of fasting blood sugar indicates a greater risk of developing type 2 diabetes.

The results of the HEALTHY Study appear online in the New England Journal of Medicine June 27, 2010, and coincide with presentation of the results at the 70th annual scientific sessions of the American Diabetes Association (ADA) in Orlando, Fla. The study was funded by the NIDDK, a part of the National Institutes of Health, and the ADA.

"We will only stop the diabetes epidemic if we continue to test innovative approaches to help children make healthy lifestyle choices," said Richard M. Bergenstal, M.D., president, Medicine and Science, ADA. "The HEALTHY Study shows us an effective approach that can be implemented to improve the outcomes of a large number of youth at very high risk of diabetes."

Because type 2 diabetes disproportionately affects minorities and low-income people, the study was conducted in schools with a high enrollment of minority children (54 percent Hispanic and 18 percent African-American) and youth from low-income families. About 75 percent of students were eligible for free or reduced-price meals.

At the beginning of sixth grade, many students had signs of high diabetes risk. Nearly half were overweight or obese, 16 percent had elevated fasting blood glucose levels, and nearly 7 percent had elevated fasting insulin levels. At the end of the eighth grade, students were tested for diabetes risk factors, including fasting blood levels of glucose, insulin, and lipids as well as height, weight, blood pressure, fitness level, and waist circumference.

The program consisted of

- Healthier choices in the cafeteria, snack bars, class events, and vending machines (lower fat, higher fiber foods; more fruits and vegetables; and an emphasis on water, low-fat milk, and drinks with no added sugar)
- Longer, more intense periods of physical activity, defined as achieving a

heart rate of at least 130 beats per minute, with a target of 150 minutes or more over a 10-day period
- Activities and awareness campaigns that promoted long-term healthy behaviors.

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