Trends in

Medical Research

Body Mass Index in Adolescence Associated With Early Occurrence of Diabetes and Heart Disease

A new 17 year follow-up study of 37,000 Israeli teenagers found that diabetes risk is mainly associated with increased body mass index (BMI) close to the time of diagnosis at early adulthood, while coronary heart disease risk is associated with elevated BMI both at adolescence and adulthood.

The findings are published in the April 7 issue of the New England Journal of Medicine.

Lead study author, Amir Tirosh, MD PhD, of the Endocrine Division at Brigham and Women's Hospital said, "The study suggests that the obesity problem in children and teens is likely just the tip of an iceberg for increased risk for type 2 diabetes and heart disease in adulthood."

The research team, also including Ben-Gurion Univeristy's Profesors Iris Shai and Assaf Rudich, in Beer-Sheva, Israel, along with researchers from the Israeli Defense Force (IDF) Medical Corps and Tel Hashomer, has followed 37,000 Israeli army career personnel, starting at age 17 years.

Their BMI was recorded at baseline and again every several years. During a mean follow-up period of 17 years, the average BMI of the participants rose at a rate of 0.2-0.3 units per year, mounting to an average weight gain of approximately 30 lbs between ages 17 and 30. During the study period, 1,173 new cases of diabetes and 327 new cases of heart disease were diagnosed.

When controlling for multiple risk factors for both diseases, including age, fasting blood sugar, blood lipids, blood pressure, smoking and family history, the researchers found that at age 17, BMI, even in the currently considered normal range, could predict the occurrence of both diseases. Every rise in 1 unit of BMI was associated with an approximately 10 percent increased risk for type 2 diabetes in early adulthood, and 12 percent increase in the risk for heart disease.

"Previous studies did not unequivocally confirm the association between pre-adulthood BMI and diseases in early adulthood. This study is significant because it demonstrates that the association exists within the currently-considered normal values for BMI, having distinct effect on two diseases occurring in early adulthood and in an age group that is frequently neglected," said Professor Assaf Rudich.

Remarkably, elevated risk at age 17 was significant at a BMI of 23.4 Kg/m2 or higher for diabetes and 20.9 Kg/m2 or higher for heart disease (These values correspond to a weight of 163 lbs or 146 lbs in a 5'10" male teenager, respectively). For diabetes, BMI at age 17 predicted the risk mainly since it is associated with BMI later in life. However, for heart disease, both BMI at adolescence as well as BMI at adulthood independently predicted the risk of the disease.

"It would seem that heart disease has a longer "memory" for BMI than diabetes, and history of a person's BMI should be part of risk assessment," said Profesor Iris Shai. "We do have options, not necessarily pharmacological, to offer patients to decrease their risk for heart disease. Recent intervention trials showed that nutritional habits modification can not only halt the progression of atheorsclerosis, the underlying process of heart disease, but could also reverse it."

Dr. Amir Tirosh adds, "For prevention of early occurrence of heart disease in adulthood it would seem that very early intervention to promote healthy life-style habits is warranted, even during childhood."

Journal Reference: 1. Amir Tirosh et al. Adolescent BMI Trajectory and Risk of Diabetes versus Coronary Disease. New England Journal of Medicine, 2011; 364:1315-1325; April 7, 2011 DOI: 10.1056/NEJMoa1006992