

Study Finds Short-Term Lifestyle Changes Improve Health Even Without Major Weight Loss

Three-week diet and exercise intervention reverses metabolic syndrome, Type 2 diabetes in 50% of those with either condition

BETHESDA, Md. (Jan. 10, 2006) – Obese and overweight individuals suffering metabolic syndrome and Type 2 diabetes showed significant health improvements after only three weeks of diet and moderate exercise even though the participants remained overweight.

“The study shows, contrary to common belief, that Type 2 diabetes and metabolic syndrome can be reversed solely through lifestyle changes,” according to lead researcher Christian Roberts of University of California, Los Angeles.

“This regimen reversed a clinical diagnosis of Type 2 diabetes or metabolic syndrome in about half the participants who had either of those conditions. However, the regimen may not have reversed damage such as plaque development in the arteries,” Roberts said. “However, if Type 2 diabetes and metabolic syndrome continue to be controlled, further damage would likely be minimized and it’s plausible that continuing to follow the program long-term may result in reversal of atherosclerosis.”

“The results are all the more interesting because the changes occurred in the absence of major weight loss, challenging the commonly held belief that individuals must normalize their weight before achieving health benefits,” Roberts said. Participants did lose two to three pounds per week, but they were still obese after the 3-week study.

The study, “Effect of a diet and exercise intervention on oxidative stress, inflammation, MMP-9, and monocyte chemotactic activity in men with metabolic syndrome factors,” is in the online edition of the **Journal of Applied Physiology** published by the **American Physiological Society**. Researchers were Christian K. Roberts, Dean Won, Sandeep Pruthi, Silvia Kurtovic, and R. James Barnard, all of UCLA; Ram K. Sindhu of Charles R. Drew University, Los Angeles; and Nosratola D. Vaziri of University of California, Irvine.

The study involved 31 men who ate a high-fiber, low-fat diet with no limit to the number of calories they could consume. The participants also did 45-60 minutes of aerobic exercise per day on a treadmill.

Fifteen of the men had metabolic syndrome, a condition that is characterized by excessive abdominal fat, insulin resistance, and blood fat disorders such as high levels of triglycerides (fat in the blood) or low levels of HDL (high density lipoprotein, or “good” cholesterol). Thirteen of the participants had Type 2 diabetes. There was also some overlap between the two groups and some participants who had neither metabolic syndrome nor Type 2 diabetes, but were overweight or obese.

“The diet, combined with moderate exercise, improved many factors that contribute to heart disease and that are indirect measures of plaque progression in the arteries, including insulin resistance, high cholesterol, and markers of developing atherosclerosis,” Roberts said. “The approach used in this experiment of combining exercise with a diet of unlimited calories is unusual.”

Low-calorie foods

The participants in the current study, who ranged in age from 46 to 76 years old, took part in a 21-day residential program at the Pritikin Longevity Center, formerly in Santa Monica, combining the Pritikin diet and exercise program. The daily diet was low fat (12-15% of calories), moderate protein (15-20% of calories), and high in unrefined carbohydrates (65-70% of calories) and fiber (more than 40 grams).

Natural foods -- whole grains (five or more servings daily), vegetables (four or more servings), and fruits (three or more servings) -- were the main source of daily carbohydrates. The sources of protein were plants (such as soy, beans, and nuts), nonfat dairy (up to two servings daily), and fish and poultry (3.5-ounce portion once a week and in soups and casseroles twice a week). The remainder of the calories came from fat with a polyunsaturated-to-saturated fatty acid ratio of 2.4 to 1.

"Aside from meat and dairy, the study participants could eat as much as they wanted," Roberts said. "Because the food was not as high calorie as a typical American diet, the participants ate less before feeling full. This is a departure from most diets, which usually leave the dieter feeling hungry," he said.

The men also exercised daily on a treadmill, including level and graded walking, for 45-60 minutes. The exercise program was tailored to ensure each individual reached 70-85% of maximum heart rate.

Next steps

Trials outside the laboratory environment are needed to test the regimen in the general population. "The findings are likely generalizable, although the magnitude of change is proportional to the degree of abnormality when the person begins the regimen," Roberts added.

Scientists also need to determine whether long-term lifestyle change can prevent or reverse end-organ damage noted in those with metabolic syndrome or Type 2 diabetes, Roberts said. These changes may be difficult to make but the payoff for individuals and society could be enormous.

Further studies are also needed in those who are at risk for metabolic syndrome or Type 2 diabetes. Individuals should still be tested to see if Type 2 diabetes and metabolic syndrome can be prevented in the first place. Individuals may be considered healthy before developing metabolic syndrome but looking healthy does not necessarily mean being healthy, he noted.

Source and funding

"Effect of a diet and exercise intervention on oxidative stress, inflammation, MMP-9, and monocyte chemotactic activity in men with metabolic syndrome factors," by Christian K. Roberts, Dean Won, Sandeep Pruthi, Silvia Kurtovic, and R. James Barnard, of the Department of Physiological Science at UCLA; Ram K. Sindhu of the Division of Endocrinology, Metabolism, and Molecular Medicine at Charles R. Drew University, Los Angeles; and Nosratola D. Vaziri of the Division of Nephrology and Hypertension, Department of Medicine at University of California, Irvine is in the online issue of the **Journal of Applied Physiology** published by the **American Physiological Society**.

Research was supported by a grant from the LB Research and Education Foundation, an independent foundation in California and a National Research Scholarship Award postdoctoral fellowship from the NIH.

Editor's note: The media may obtain a copy of Roberts et al. by contacting Christine Guilfooy, American Physiological Society, (301) 634-7253, (978) 290-2400 (cell), or cguilfooy@the-aps.org.

* * *