

## Soft Drinks Linked to Metabolic Syndrome Risk

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July 23, 2007

BOSTON, July 23 -- Soft drinks, whether diet or regular, are associated with substantially increased metabolic syndrome risk among middle-age adults, according to a large community-based study.

Men and women who drank more than one soda daily had a 48% adjusted higher prevalence and 44% higher roughly eight-year adjusted incidence of the cluster of heart disease risk factors than those who drank less, reported Ramachandran S. Vasan, M.D., of Boston University, and colleagues, online in *Circulation, Journal of the American Heart Association*.

These results from an analysis of the Framingham Heart Study extend previous findings that soft drink consumption contributes to obesity and insulin resistance in children and hypertension in adults.

The surprising lack of difference in risk between artificially-sweetened and regular drinks implied that soda intake may be a marker for overall eating habits that contribute to risk, commented Richard Stein, M.D., of New York University, acting as an American Heart Association spokesperson.

"Heart disease is not a single-cause disease; clearly it's a lifestyle disease," he said, adding, "I think the answer is to look at all the diet factors and if you are getting enough exercise."

"I would consider this a wakeup call," he said. "If you have metabolic syndrome your risk goes up almost fourfold of having a heart attack over the next 10 years."

In the Framingham Heart Study, participants were followed for three consecutive periods spanning 1987 to 1995 with a physical exam, food frequency questionnaires, and fasting plasma lipid, glucose, and triglyceride measurements about every four years.

Overall there were 8,997 person-observations, of which 6,039 person-observations were among participants free of metabolic syndrome at baseline. The mean age was 52.9 in this prospective cohort.

Metabolic syndrome was defined having at least three of the following risk factors:

Waist circumference at least 35 inches for women or at least 40 inches for men.

Fasting blood glucose at least 100 mg/dL.

Serum triglycerides at least 150 mg/dL.

Blood pressure at least 135/85 mm Hg.

High-density lipoprotein cholesterol lower than 40 mg/dL for men or 50 mg/dL for women.

About 35% of the participants reported during the physician-administered questionnaire that they typically drank at least one 12-ounce soft drink per day. But 22% of reported drinking an average of at least one diet or regular soda per day on the self-administered food frequency questionnaire.

In multivariable analysis adjusting for age, sex, physical activity, smoking, and intake of fat, total calories and other dietary factors, metabolic syndrome prevalence findings were:

48% higher among participants who reported drinking at least one diet or regular soft drink daily compared with those who did not report drinking soda on the physician-administered questionnaire (odds ratio 1.48, 95% CI 1.30 to 1.69).

1.80-fold higher among participants who drank one diet soda per day than those who reported drinking less than one a week on the self-administered questionnaire (95% confidence interval 1.45 to 2.25).

1.81-fold higher among participants who drank one regular soda per day than those who reported drinking less than one a week on the self-administered questionnaire (95% CI 1.28 to 2.56).

Likewise, the adjusted incidence was significantly higher with regular soft drink consumption but similar between regular and diet soda drinkers. The findings were:

44% higher among participants who reported drinking at least one diet or regular soft drink daily compared with those who did not report drinking soda on the physician-administered questionnaire (odds ratio 1.44, 95% CI 1.20 to 1.74).

1.53-fold higher among participants who drank one diet soda per day than those who reported drinking less than one a week on the self-administered questionnaire (95% confidence interval 1.10 to 2.15).

1.62-fold higher among participants who drank one regular soda per day than those who reported drinking less than one a week on the self-administered questionnaire (95% CI 0.96 to 2.75).

Incidence of individual metabolic syndrome traits was also 25% to 32% higher among participants who drank at least one soft drink per day, although the 18% higher odds of hypertension was only a trend ( $P=0.10$ ).

The results were similar whether soda was caffeinated or decaffeinated.

However, the reason for the similarity between findings with sugar- versus artificially-sweetened drinks was unclear.

"The similar metabolic hazard posed by both regular and diet soft drinks is noteworthy given the lack of calories in the latter," the researchers noted.

"This is the first study to ever show there wasn't a distinction," Dr. Stein said.

But, the researchers noted that residual dietary confounding could have played a part because greater soft drink intake has been linked to more calorie and saturated and trans fats intake and less fiber, dairy, and physical activity.

The researchers said that public health policy to limit soft drink consumption in the community might be beneficial. But, Dr. Stein recommended a more global approach to the problem.

"For any given person among us it's not about stopping one food product," he said. "It's really about eating more fruits and vegetables, keeping our calories down, getting our exercise levels up, moderate restriction of salt...and making sure your portion size...is kept appropriate."

### **Action Points**

Explain that interested patients that even one glass of soda daily may indicate an increased risk of metabolic syndrome.

Caution patients that it is not known whether the association between metabolic syndrome and soda intake was causal or reflected a difference in overall diet and lifestyle.

The study was supported through National Heart, Lung, and Blood Institute contracts and by an award from the American Diabetes Association to one of the researchers. The researchers and Dr. Stein reported no conflicts of interest, although Dr. Stein is a spokesperson for the American Heart Association.

Primary source: *Circulation*

Source reference:

Dhingra R, et al "Soft Drink Consumption and Risk of Developing Cardiometabolic Risk Factors and the Metabolic Syndrome in Middle-Aged Adults in the Community" *Circulation*. 2007;116.