Higher trans fat levels in blood associated with elevated risk of heart disease

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High consumption of trans fat, found mainly in partially hydrogenated vegetable oils and widely used by the food industry, has been linked to an increased risk of coronary heart disease (CHD). New York and Philadelphia have passed measures eliminating its use in restaurants, and other cities are considering similar bans. A new study from the Harvard School of Public Health (HSPH) provides the strongest association to date between trans fat and heart disease. It found that women in the U.S. with the highest levels of trans fat in their blood had three times the risk of CHD as those with the lowest levels.

The study was published online on March 26, 2007, and will appear in the April 10, 2007 print issue of Circulation: Journal of the American Heart Association.

"The strength of this study is that the amount of trans fatty acid levels was measured in blood samples from the study population. Because humans cannot synthesize trans fatty acids, the amount of trans fat in red blood cells is an excellent biomarker of trans fat intake," said senior author Frank Hu, associate professor of nutrition and epidemiology at HSPH.

Clinical trials have shown that trans fatty acids increase LDL cholesterol and lower HDL cholesterol, making them the only class of fatty acids, which includes saturated fat, to have this dual effect. HDL (high-density lipoprotein) is considered a "good" cholesterol; LDL (low-density lipoprotein) a "bad" cholesterol.

The researchers, led by Hu and lead author Qi Sun, a graduate research assistant at HSPH, set out to test the assumption that higher trans fatty acid levels in erythrocytes—red blood cells—were associated with a higher risk of heart disease among U.S. women. Blood samples collected in 1989 and 1990 from 32,826 participants in the Brigham and Women's Hospital-based Nurses' Health Study were examined. During six years of follow-up, 166 cases of CHD were diagnosed and matched with 327 controls for age, smoking status, fasting status and date of blood drawing.

After adjusting for age, smoking status and other dietary and lifestyle cardiovascular risk factors, the researchers found that a higher level of trans fatty acids in red blood cells was associated with an elevated risk of CHD. The risk among women in the top quartile of trans fat levels was triple that of the lowest quartile. "Positive associations have been shown in earlier studies based on dietary data provided by the participants, but the use of biomarkers of trans fatty acids is believed to be more reliable than self-reports. This is probably the reason why we see an even stronger association between blood levels of trans fat and risk of CHD in this study," said Sun.

"These data provide further justifications for current efforts to remove trans fat from foods and restaurant meals," said Hu. "Trans fat intake in the U.S. is still high. Reducing trans fat intake should remain an important public health priority."

Source: Harvard School of Public Health