Cholesterol levels rise, fall with changing seasons

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Cholesterol levels seem to fluctuate significantly with the turning seasons, which may leave some people with borderline high cholesterol at greater cardiovascular risk during the winter months, according to research being presented at the American College of Cardiology's 62nd Annual Scientific Session.

While prior studies have shown that heart attacks and heart-related deaths increase during the winter months, researchers in Brazil were interested in finding out whether the prevalence of high cholesterol—a well-known cardiovascular risk factor—might follow a similar pattern.

"People should be aware that their cholesterol and triglyceride levels vary significantly year-round, which in some cases, may lead to a misinterpretation of a person's actual cardiovascular risk," said Filipe Moura, MD, a PhD student at the State University of Campinas, Brazil and the study's lead investigator. "This should especially concern those who are near the upper cholesterol limit as they may be at higher risk than expected. This is not to say these patients should have check-ups all the time, but we do have to keep a close eye on them and know seasonal variation may play a role."

Researchers prospectively evaluated the lipid profiles of 227,359 individuals who had health check-ups in primary care centers in the city of Campinas, Brazil, between 2008 and 2010. In this analysis—the largest study to date to evaluate cholesterol levels by season—data reveal that low density lipoprotein (LDL) or "bad" cholesterol increased an

average of 7mg/dL during the winter compared to summer. Researchers say this moderate, but significant, increase in LDL cholesterol was enough to result in an 8 percent overall increase in the prevalence of high cholesterol during the winter. The variation in the maximum and minimum cholesterol measures were 7±2 mg/dL for LDL-C, 3.4±0.3 mg/dL for HDL and 12±9 mg/dL for triglycerides. While the rise in LDL was more pronounced in women and middle-aged people, Dr. Moura said this is most likely due to the larger sample size in these categories after stratification by sex and age.

Cholesterol levels during the summer months painted a very different picture, with higher levels of high density lipoprotein (HDL), the "good" cholesterol, and triglycerides, which were respectively 9 percent and 5 percent more prevalent. Dr. Moura said researchers were surprised by these findings because they contradict what previous, smaller studies have found. One possible explanation is that this study is the first to take place in a tropical climate. Campinas is situated 1,821-2,559 feet above sea level and has mild, dry winters.

Still, Dr. Moura said, these fluctuations may be even more pronounced in the United States, Europe or other regions that experience more extreme climate shifts in winter and summer. Along with the environmental changes of each season also come alterations in exercise and dietary habits that can influence cholesterol levels. For example, people tend to exercise less and consume a greater number of calories and fatty foods in the winter. The shorter days of winter also mean less sun exposure and subsequently lower concentrations of vitamin D. Vitamin D has been shown to improve the ratio of bad to good cholesterol.

"The change in climate and behavior that follows each season can have an effect on lipid metabolism and possibly even heart health," Dr. Moura said. "However, in order to make this link more research is needed."

As a next step, Dr. Moura and his team plan to look at patients who already had heart disease. They will evaluate a prospective cohort of patients in the Brasilia Heart Study who present with heart attack to see whether there is seasonal variation of lipid profile upon hospital admission.

More information: Dr. Moura will present the study "Seasonal Variation of Lipid Profile and Prevalence of Dyslipidemia: A Large Population Study" on Saturday, March 9 at 10:00 a.m., in Moscone Center, Expo North.

Provided by American College of Cardiology