

Nutrition

focus

GENETIC ROLE IN THE LINK BETWEEN LONG-TERM COFFEE CONSUMPTION AND RISK OF CARDIOVASCULAR DISEASE

Background

Coffee is one of the most widely consumed beverages worldwide, an estimated 3 billion cups, daily. Coffee is considered to be safe, as well as, have health benefits. The antioxidant and anti-inflammatory properties in some compounds in coffee act by changing our genes. However, caffeine, the main bioactive compound in coffee, acts as a stimulant and can lead to acute increases in blood pressure. It is suggested that individuals who carry a functional version of the gene, CYP1A2 and those whose bodies are not as effective in metabolizing caffeine, may be at greater risk for cardiovascular diseases (CVD).

Purpose

This study aims to determine whether individuals who drink coffee and have a certain functional gene or those that have a genetic predisposition to ineffective caffeine metabolism, are more at risk for CVD.

Population

The participants in this study included 347,077 white British Caucasians, 8,368 of them with CVD, aged 37-73 years, living in the United Kingdom. Participants coffee consumption ranged from <1 to >6 cups and 27% had the genotype for ineffective caffeine metabolism.

Procedure

The participants in this study were part of the UK Biobank, a large study that included blood, urine and saliva samples, clinical assessments, cardiovascular traits, coffee intake, genotyping, BMI, physical activity, alcohol intake, smoking, education, age, sex and tea intake, of all participants. Logistic regression, a way to analyze data when the dependent variable (CVD) maybe binary (coffee consumption and genetics), was used to analyze the participants collected information. This system goes through each participants information and determines whether their coffee consumption and genetics is linked to a risk of CVD.

Results

It was found that those with CYP1A2 genotype or a genetic predisposition to ineffective caffeine metabolism did not have a greater risk of CVD when drinking coffee. However, there was a link between slow caffeine metabolism and having high blood pressure. It was also found that those who cannot effectively metabolize caffeine tend to drink less coffee and tea. This suggests that the body self-regulates caffeine consumption in order to maintain normal blood pressure. Those who consumed decaf had on average lower blood pressure. Evidence showed that regardless of genetics, participants who consumed 1-2 cups of coffee a day were the least at risk for CVD. On the other hand, nondrinkers, drinkers of decaf coffee and those who consumed more than 6 cups a day increased their risk of CVD by, 11%, 7% and 22%, respectively.

1-2 cups of coffee consumption is linked to a low risk of CVD, with no influence from genetics.

Limitations

The limitations of this study are that the participants do not represent the general population and are restricted to Caucasians living in the UK. Further studies should include individuals of different ethnic groups. In addition, coffee intake was self-reported, so to some degree may be biased, especially since 1 cup was not defined (i.e., oz or mL) and varies in different parts of the world.

Conclusion

A genotype or genetic predisposition to ineffective caffeine metabolism, has no influence on CVD when associated with coffee consumption. However, regardless of genetics, drinking large amounts (>6 cups/day) of coffee is associated with an increased risk of CVD. Nevertheless, moderate amounts (1-2 cups/day) of coffee consumption can provide antioxidant, anti-inflammatory properties and reduce the risk of CVD.

The full article is titled, "Long-term coffee consumption, caffeine metabolism genetics, and risk of cardiovascular disease: a prospective analysis of up to 347,077 individuals and 8,368 cases", published in the American Journal of Clinical Nutrition, written by, Ang Zhou and Elina Hyppönen, pg. 509-516, March 2019.