Coffee and **Cardiovascular Health**

Key Points

- Cardiovascular disease (CVD) is a leading cause of death worldwide, with coronary heart disease (CHD) and stroke among the most common types.
- Moderate coffee consumption is associated with a potential reduced risk of Coronary Heart Disease (CHD), stroke and atrial fibrillation (AF).
- The mechanisms underlying the associations are not fully understood, but bioactive compounds in coffee may play a role.
- Most evidence relates to observational studies in general populations and should not be interpreted as individual advice for people with established cardiovascular disease.

Disease burden

Cardiovascular diseases (CVD)

- Conditions affecting the heart and blood vessels
- The most common types are Coronary Heart Disease (CHD) and stroke
- Atrial fibrillation (AF) is the most common cardiac arrhythmia, affecting the two upper chambers (atria) of the heart.

Global CVD deaths increased from 13.1 million in 1990 to 19.2 million in 2023, while CVD cases have more than doubled from 311 million to 626 million[1].

In Europe, CVD (primarily CHD and stroke) causes more than 3 million deaths each year, including 1.5 million deaths in men and over 1.6 million in women, accounting for 34% and 39% of all deaths in men and women respectively[2,3].

Major risk factors for CVD include:

- Obesity or being overweight
- Unhealthy lifestyle habits, e.g. smoking, excess alcohol consumption, low levels of physical activity
- Sex, higher incidence in men when adjusted for age
- Age, higher prevalence in those over 50
- Ethnicity, more prevalent in South Asian, Black African or Afro-Caribbean
- Existing health conditions, e.g. diabetes, high blood pressure, high cholesterol

Association with CVD risk

Moderate coffee consumption is associated with a reduced risk of developing CVD and CVD-related mortality, with studies suggesting a potential protective effect against CHD, atrial fibrillation and stroke[4,5,6,7].

- **CHD:** A UK Biobank study found that coffee consumption was associated with an **11% lower risk** of CHD, with the lowest risk observed at around 2-3 cups per day (HR=0.89)[7].
- **Stroke:** A meta-analysis found a **21% lower risk** of stroke among people consuming 3-4 cups of coffee per day, with a U-shaped association observed between coffee consumption and stroke risk[8].
- The association appeared stronger for ischaemic stroke, with a separate meta-analysis reporting a 17% lower risk (HR=0.834) among coffee consumers[9].
- **Atrial fibrillation:** Large UK Biobank studies suggest that coffee consumption is not associated with an increased risk of atrial fibrillation and may be protective, with the lowest arrhythmia risk observed at 2-3 cups per day[7] and each additional cup of coffee is associated with a 2% lower risk of atrial fibrillation[10].

Potential mechanisms

The mechanisms underlying coffee's observed associations with cardiovascular health are not fully understood. However, studies suggest that compounds other than caffeine may contribute to these effects, as inverse associations with cardiovascular disease have also been observed for decaffeinated coffee[7].

Coffee contains a range of bioactive compounds that may influence cardiovascular health:

- **Polyphenols** – Polyphenols, particularly chlorogenic acids, are among the major antioxidant compounds found in coffee. These compounds have been proposed as one potential explanation for coffee's observed cardiovascular associations due to their antioxidant and vascular effects. Coffee consumption has also been shown to increase the antioxidant capacity of plasma[11].
- **Diterpenes** – The diterpenes cafestol and kahweol, naturally present in coffee oils, can raise total and LDL cholesterol levels . Their concentration varies according to brewing method, with higher levels found in unfiltered coffees and substantially lower levels in filtered and soluble coffee.

The ability of some coffee preparations to increase LDL cholesterol highlights the complexity of coffee's biological effects and suggests that other mechanisms may contribute to the favourable cardiovascular associations observed in epidemiological studies[13].

Scan to explore the research on cardiovascular health in more detail.

Public health message

Moderate coffee intake is associated with a reduced risk of cardiovascular disease. The European Society of Cardiology (ESC) states that 'moderate coffee consumption (3-4 cups per day) is probably not harmful, perhaps even moderately beneficial'[14].

The European Food Safety Authority's (EFSA) review on the Safety of Caffeine concluded that moderate caffeine consumption, of around 400 mg of caffeine per day (the equivalent of up to 5 cups of coffee), can be enjoyed as part of a healthy balanced diet and an active lifestyle. EFSA also concludes that in pregnancy, the daily caffeine limit should be 200mg from all sources[15].

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