Habitual caffeine consumption on cardiovascular health: A comprehensive review of blood pressure, lipid profiles, and glucose metabolism

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ABSTRACT

Introduction: Caffeine stands as the most extensively consumed non-intoxicating psychoactive compound globally, primarily ingested via common beverages such as coffee and tea. Its widespread consumption, observed in approximately 90% of adults on a regular basis, underscores its deep cultural and social integration into daily routines. This literature review aim to investigate the physiological impacts of chronic habitual caffeine consumption on cardiovascular risk factors, specifically blood pressure, lipid profiles, and glucose metabolism. **Materials and Methods:** The literature review involved searching multiple electronic databases, specifically PubMed, Scopus, SpringerLink, Cochrane Library, Elsevier, UpToDate, and Google Scholar, for articles published between 2008 and 2024. Only articles in English were included. The search utilised a combination of keywords: caffeine, cardiovascular disease, hypertension, blood pressure, glucose, sugar, diabetes mellitus, lipid, and cholesterol, which yielded 20 relevant papers for inclusion in this review. **Results:** Evidence suggests that caffeine's physiological effects are dose-dependent. While acute consumption can lead to transient increases in blood pressure due to vasoconstriction and sympathetic activation, habitual intake (up to 400 mg/day) typically results in tolerance, diminishing these acute responses. Indeed, several population-based investigations have revealed either neutral or favourable relationships between moderate caffeine consumption and indicators of arterial stiffness or blood pressure. Pertaining to lipid metabolism, consistent caffeine intake has been associated with higher high-density lipoprotein (HDL) levels and lower triglycerides. Nevertheless, the impact on low-density lipoprotein (LDL) and total cholesterol remains less conclusive. Caffeine's influence on lipid metabolism is partly attributed to its ability to enhance lipolysis through cyclic adenosine monophosphate (cAMP) mediated pathways and increased catecholamine release. Furthermore, in glucose metabolism, specific bioactive compounds found in coffee, such as chlorogenic acid, appear to improve insulin sensitivity and contribute to a reduced risk of type 2 diabetes mellitus. **Conclusion:** The evidence suggests that habitual moderate caffeine intake is not associated with a notable increase in cardiovascular risk and may even offer protective metabolic effects. Nevertheless, intake above approximately 400 mg/day can result in undesirable outcomes, such as palpitations, anxiety, and increased cardiovascular burden. These insights necessitate clear public health awareness regarding the dose-dependent nature of caffeine's impact, particularly in heavy-consuming populations, advocating for moderation in consumption habits. Ultimately, moderate caffeine consumption is largely safe for cardiovascular health and may offer metabolic advantages to habitual users.

Keywords: Caffeine, blood pressure, lipid, glucose, cardiovascular disease