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INVITED EDITORIAL

Diet as a cornerstone of cardiovascular prevention: the key role of coffee consumption

Sebastiano Cicco *

Department of Biomedical Sciences and Human Oncology (DIMO), Unit of Internal Medicine and Clinical Oncology, University of Bari Aldo Moro Medical School, Unit of Internal Medicine "Guido Baccelli", AUOC Policlinico di Bari, Piazza Giulio Cesare, 11, Bari 70124, Italy

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This editorial refers to 'Light to moderate coffee consumption is associated with lower risk of death: a UK Biobank study', by J. Simon *et al.*, pp. 982–991.

Cardiovascular diseases (CVDs) are still the leading cause of death. Recent reports estimated that about 18 million people die each year from CVDs, consisting of about 32% of all deaths worldwide.[1,2]

Despite many efforts have been spent to reduce the cardiovascular risk, many others should be done to pull over the cardiovascular death burden. American Heart Association[1] and European Society of Cardiology[2] identified behavioural (smoking, physical activity, diet, and weight) and clinical (cholesterol, blood pressure, and glucose control) factors that contribute to cardiovascular health. CVDs' behavioural risk factors were numerous. The most important (ones) are unhealthy diet, physical inactivity, tobacco use, and harmful use of alcohol. The effect may show up in blood pressure increase, raised blood glucose, and/or lipids. A prolonged exposure to these risk factors may induce an increase in cardiovascular (CV) death risk as an increased risk of heart attack, stroke, heart failure, and other complications.[1] However, there are regional and national differences described[3] (*Figure 1A*) mostly related to differences in culture and behaviour.

As clinicians, we have to answer some simple questions in CVD prevention's debate.

Is diet the main extra-pharmacological item to achieve a better cardiovascular prevention? Dietary habits are inversely associated with the incident risk of cardiovascular death.[5] Many efforts were spent to identify the better diet to use. Mediterranean[6] and plant-based diet[7] are associated with a better cardiovascular prevention. In a large primary prevention trial[8] among patients with high CVD risk factors, patients randomized to unrestricted-calorie Mediterranean-style diets supplemented with extra-virgin olive oil or mixed nuts had about 30% reduction in the risk of stroke, myocardial infarction, and death attributable to cardiovascular causes, without changes in body weight. The second question is if it should be possible to have a standardized diet worldwide. Some authors suggest caution in a standardized use of Mediterranean diet for primary cardiovascular care.[9] Moreover, many regional and national differences in culture influence individual and population diet. Therefore, it is quite impossible to achieve the same diet all over the world.

On the contrary, a good percentage of people consume the same type of some nutrients. Coffee is one of these. In fact, it is the most popular drink in the world regardless of diet[4]; thus, coffee may have a key role in nutrition management. Large population studies demonstrated the role of coffee in the reduction of mortality.[10] Multiple effects were described on humans. In particular, coffee results related to the increase in antioxidant effects[11] and lowering in inflammation.[12] This effect is mostly related to polyphenols, some of the most powerful antioxidant molecules known in food.[13] Coffee is rich of them.[14] It was demonstrated that coffee-related polyphenols are effective in reducing reactive oxygen species and oxidative stress in cells,[14,15] especially after coffee digestion.[16] Digested coffee is also able to reduce inflammatory mediators, as the reduction of IL-6 levels demonstrates.[16]

However, many other questions need answers. For example, is coffee able to change also heart remodelling? Are all the types of coffee able to obtain the same effect? What is the amount needed?

Simon *et al.*[17] tried to address these queries. They used a large asymptomatic non-CVDs population followed overtime to search the role of coffee on all-cause and cardiovascular mortality, defining 0.5–3 cups per day as a light-to-moderate consumption. This range, as they described, is associated with a decrease in cardiovascular mortality and incidental stroke (hazard ratio (HR) 0.83 and 0.79 respectively). Moreover, differences arose when they analysed the type of coffee consumed. In fact, decaffeinated or ground but not instant coffee is more associated with a decrease in all-cause mortality. Instead, each type of coffee is differently involved in CV mortality. In fact, only ground coffee results in protective against CV mortality. This effect results not related to the amount of coffee taken, resulting even better in high consumers (light-to-moderate HR = 0.75, high daily HR = 0.51). Instead, instant coffee is not associated with an increased risk of incident angina.

* Corresponding author. Tel: +39 080 5592757, Email sebacicco@gmail.com, sebastiano.cicco@uniba.it

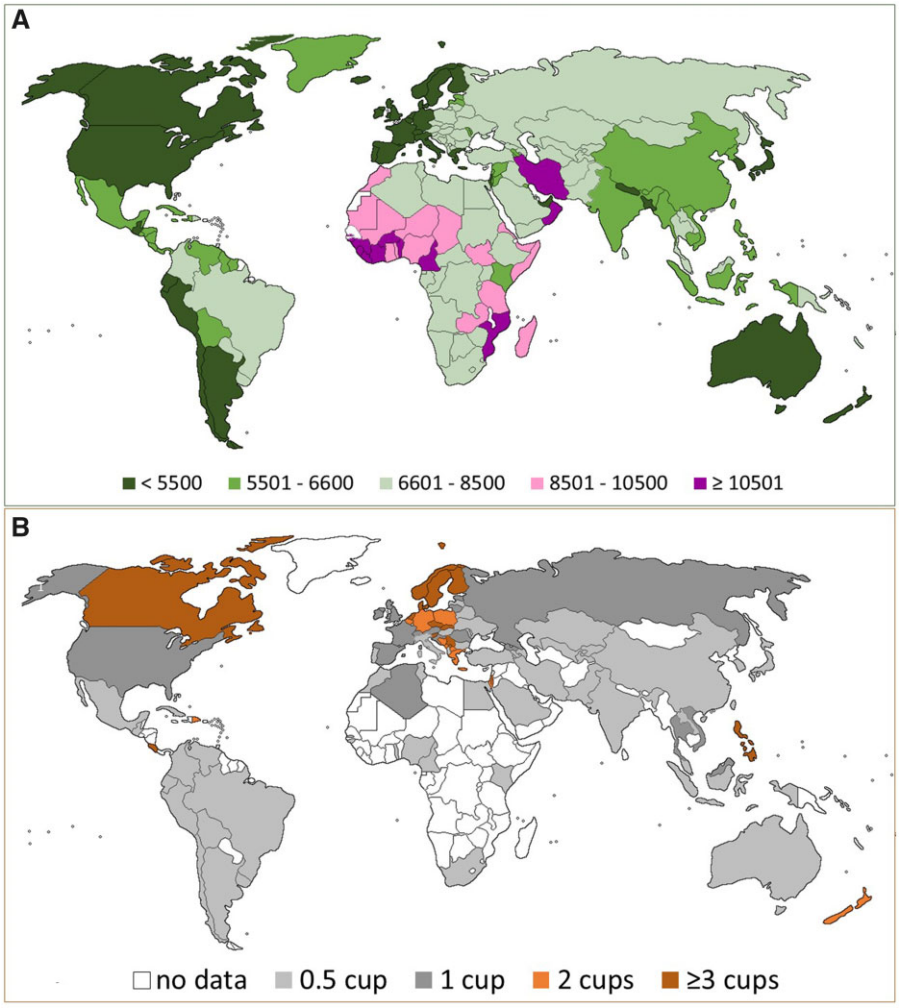

Figure 1 Age-standardized prevalence of cardiovascular disease in 2015[3] (*A*—as cases on 100 000 habitants) and coffee consumption[4] (*B*—as cups per day), all over the world.

These results may be good enough to suggest some nutritional changes to achieve CV prevention.

But these authors did something more. They look to structural damages. First, they search a possible role of coffee in vascular damage analysing data on arterial stiffness index. They found a decrease in these values in light-to-moderate consumers, especially when a multivariate analysis that includes hypertension, diabetes mellitus, and cholesterol level was performed. Second, they look to a possible change in heart remodelling. To achieve this aim, cardiac magnetic resonance was evaluated. This is considered the most accurate and reproducible heart imaging method available to date[18] due to its lower interstudy difference compared to other methods.[19,20] Based on these assumptions, Simon *et al.* found a better heart phenotype based on a favourable heart remodelling in light-to-moderate coffee consumers.

This article may be considered as a good starting point for the definition of amount and type of coffee useful to cardiovascular prevention. Remarkably, this result is evaluated on CVD-free large population (over 400 000 people). Therefore, the authors described the effect of coffee consumption as not related to previous possible confounders on heart remodelling and CV mortality. There is also a great strength of these data: the time of follow-up. In fact, all evaluations were in a 10-year follow-up.

This new analysis enhances the comprehension of the role of coffee in cardiovascular remodelling. These data include the possible role of different types and different amounts of this beverage in cardiovascular damage. Then, the results and information provided may also be useful to suggest additional diet treatment for cardiovascular prevention.

Therefore, light-to-moderate coffee consumption looks good enough to reduce CV mortality. This result is diet independent and is related to a better heart and vessel phenotype. Thus, coffee could be a worldwide novel idea to reduce the cardiovascular burden using lifestyle habits.

Conflict of interest: none.

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