

Is Coffee Harmful? If Looking for Longevity, Say Yes to the Coffee, No to the Sugar

Letter to the Editor: Liu et al¹ reported a significant increase in all-cause mortality for men (hazard ratio, 1.56; 95% CI, 1.30-1.87) and women (hazard ratio, 2.13; 95% CI, 1.26-3.59) younger than 55 years who consumed more than 4 cups of coffee per day. The data came from a longitudinal study that measured coffee consumption preceding mortality by as much as 32 years. We can be much more confident of temporality than causality in this study. In fact, there are several reasons to believe that the associations found are not causal. First, all but the associations between the highest levels of coffee drinking and mortality became statistically insignificant in fully adjusted models. Second, the “fully” adjusted models did not include potentially important confounders, only some of which have been discussed in previous critiques.² One earlier critic raised issues of sleep disorders and insomnia for which the authors did not adjust. To these unconsidered conditions, we would like to add occupational and medical issues related to fatigue and alertness and the potential desire for stimulation through caffeinated beverages such as coffee. For instance, consuming coffee has exhibited benefits for patients with certain high-risk jobs (eg, commercial driving³ and certain shift work⁴) and fatiguing diseases (eg, major depression,⁵ cancer,^{6,7} and autoimmune disease⁸). Consumption of 4 or more cups of coffee in those younger than 55 years may simply capture more patients in the aforementioned groups, who are also at an increased risk of early mortality⁹⁻¹¹—or, at least, events that can be fatal.¹² Third, coffee consumption might just be a marker of other less-healthy food consumption, unmeasured and not addressed by Liu et al. For instance, how often did people’s cups of coffee accompany servings

of donuts, bagels, toast and jam, or other refined and sugary goods? And how often did people drink their coffee with sweetened creamer or added sugar? It has been known for at least half a century that atherosclerosis is proportional to the amount of dietary sugar and that much of the dietary sugar people consume may be taken in cups of coffee.¹³ A study conducted 50 years ago found that patients who experienced myocardial infarction consumed greater amounts of sugar overall as well as added larger amounts of sugar to their cups of coffee as compared with controls.¹³ More contemporary research on the cardiometabolic harms of sugar-sweetened beverages suggest that the customization of coffee might be more important for negative health consequences than the beverage itself.¹⁴⁻¹⁶ Indeed, coffee itself may be quite healthy. There are myriad potential bodily benefits of coffee consumption,¹⁷ with prior reports establishing reductions in both disease-specific^{18,19} and all-cause mortality.²⁰ Coffee is enjoyed by diverse populations worldwide and is the most consumed beverage in the world among adults after plain water.²¹ It would be a shame to brew up concern about this beloved beverage owing to analyses flawed in part by confounding from unmeasured disease states and unaddressed dietary intake.

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1. Liu J, Sui X, Lavie CJ, et al. Association of coffee consumption with all-cause and cardiovascular disease mortality. *Mayo Clin Proc.* 2013;88(10):1066-1074.

- Liu J, Sui X, Blair SN, Lavie CJ. In reply—association of coffee consumption with all-cause and cardiovascular disease mortality. *Mayo Clin Proc.* 2013; 88(12):1493-1494.
- Sharwood LN, Elkington J, Meuleners L, Ivers R, Boufous S, Stevenson M. Use of caffeinated substances and risk of crashes in long distance drivers of commercial vehicles: case-control study. *BMJ.* 2013;346:f1140.
- Muehlbach MJ, Walsh JK. The effects of caffeine on simulated night-shift work and subsequent daytime sleep. *Sleep.* 1995;18(1):22-29.
- Ruusunen A, Lehto SM, Tolmunen T, Mursu J, Kaplan GA, Voutilainen S. Coffee, tea and caffeine intake and the risk of severe depression in middle-aged Finnish men: the Kuopio Ischaemic Heart Disease Risk Factor Study. *Public Health Nutr.* 2010;13(8):1215-1220.
- Wilson KM, Kasperzyk JL, Rider JR, et al. Coffee consumption and prostate cancer risk and progression in the Health Professionals Follow-up Study. *J Natl Cancer Inst.* 2011;103(11):876-884.
- Bravi F, Bosetti C, Tavani A, Gallus S, La Vecchia C. Coffee reduces risk for hepatocellular carcinoma: an updated meta-analysis. *Clin Gastroenterol Hepatol.* 2013;11(11):1413-1421.
- Andersen IM, Tengedal G, Lie BA, Boberg KM, Karlsen TH, Hov JR. Effects of coffee consumption, smoking, and hormones on risk for primary sclerosing cholangitis. *Clin Gastroenterol Hepatol.* 2013; pii: S1542-3565(13)01429-8. <http://dx.doi.org/10.1016/j.cgh.2013.09.024>. [Epub ahead of print].
- Ariyo AA, Haan M, Tangen CM, et al; Cardiovascular Health Study Collaborative Research Group. Depressive symptoms and risks of coronary heart disease and mortality in elderly Americans. *Circulation.* 2000;102(15):1773-1779.
- Walsh SJ, Rau LM. Autoimmune diseases: a leading cause of death among young and middle-aged women in the United States. *Am J Public Health.* 2000;90(9):1463-1466.
- Thomas SL, Griffiths C, Smeeth L, Rooney C, Hall AJ. Burden of mortality associated with autoimmune diseases among females in the United Kingdom. *Am J Public Health.* 2010;100(11):2279-2287.
- Vyas MV, Garg AX, Iansavichus AV, et al. Shift work and vascular events: systematic review and meta-analysis. *BMJ.* 2012;345:e4800.
- Yudkin J, Roddy J. Levels of dietary sucrose in patients with occlusive atherosclerotic disease. *Lancet.* 1964;2(7349):6-8.
- Cox CL, Stanhope KL, Schwarz JM, et al. Circulating concentrations of monocyte chemoattractant protein-1, plasminogen activator inhibitor-1, and soluble leukocyte adhesion molecule-1 in overweight/obese men and women consuming fructose- or glucose-sweetened beverages for 10 weeks. *J Clin Endocrinol Metab.* 2011;96(12):E2034-E2038.
- Te Morenga L, Mallard S, Mann J. Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies. *BMJ.* 2012;346:e7492.
- Schulze MB, Manson JE, Ludwig DS, et al. Sugar-sweetened beverages, weight gain, and incidence of type 2 diabetes in young and middle-aged women. *JAMA.* 2004;292(8):927-934.
- O’Keefe JH, Bhatti SK, Patil HR, DiNicolantonio JJ, Lucan SC, Lavie CJ. Effects of habitual coffee

consumption on cardiometabolic disease, cardiovascular health, and all-cause mortality. *J Am Coll Cardiol*. 2013;62(12):1043-1051.

18. Greenberg JA, Dunbar CC, Schnoll R, Kokolis R, Kokolis S, Kassotis J. Caffeinated beverage intake and the risk of heart-disease mortality in the elderly: a prospective analysis. *Am J Clin Nutr*. 2007;85(2):392-398.
19. Freedman ND, Park Y, Abnet CC, Hollenbeck AR, Sinha R. Association of coffee drinking with total and cause-specific mortality [published correction appears in *N Engl J Med*. 2012;367(3):285]. *N Engl J Med*. 2012;366(22):1891-1904.
20. Lopez-Garcia E, van Dam RM, Li TY, Rodriguez-Artalejo F, Hu FB. The relationship of coffee consumption with mortality. *Ann Intern Med*. 2008;148(12):904-914.
21. National Coffee Association USA. *National Coffee Drinking Trends 2012*. New York, NY: National Coffee Association USA; 2012.

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In reply—Is Coffee Harmful? If Looking for Longevity, Say Yes to the Coffee, No to the Sugar

We thank DiNicolantonio et al for their interest in our article on coffee consumption and mortality.¹ We agree that the association of coffee consumption with all-cause mortality or disease-specific mortality is complex, and we cannot claim that our results establish causality because of the observational design of our study and other factors, such as unmeasured or unknown potential confounding exposures.

However, we do not agree with the opinion of DiNicolantonio et al that all but the associations between the highest levels of coffee drinking and mortality became statistically insignificant in fully adjusted models. In fact, we reported that the association exists for all models in men and also in stratified analyses for younger men and women. In addition,

we admitted in the Limitations section of our article as well as in the previous reply to the editor² that some potential important confounders, including sleep disorders and insomnia, could not be included in our analysis. Therefore, future research is needed to obtain data on these issues and reevaluate this association.

Regarding the occupational and medical issues related to fatigue and alertness, it has been confirmed in many of our earlier publications that the Advanced Cardiovascular Life Support population is homogeneous and generally healthy, the majority is from white and from middle to high socioeconomic strata, and most are employed in professional or executive occupations.³ We believe that these factors reduce the likelihood of confounding by these issues raised by DiNicolantonio et al.

Finally, regarding the possible associations of coffee consumption as a marker of other less-healthy food consumption, we agree that this needs to be considered. It is possible that drinking coffee could be accompanied by other unhealthy dietary habits and these choices could partly explain the association of coffee consumption with higher mortality. The evidence that sugar intake is associated with chronic disease is still a hotly debated topic; therefore, it is certainly not clear that sugar is causing the health problems suggested by DiNicolantonio et al. The common belief that sugar is causing health problems is inconsistent with much scientific evidence, as illustrated in the recent excellent review of sugar intake and type 2 diabetes by Cozma and Sievenpiper.³ Nevertheless, many of the unhealthy

dietary choices that could accompany coffee consumption suggested by DiNicolantonio et al would be expected to increase cardiovascular mortality; however, our large study with long follow-up did not suggest any increase in cardiovascular mortality across a large range of coffee consumption in any age or either sex.

Regardless, we appreciate the comments of DiNicolantonio et al and we agree that we need additional research to investigate the association of coffee consumption with mortality. Clearly, future research is warranted with regard to coffee consumption combined with other lifestyle choices, including dietary habits, as well as physical activity levels and cardiorepiratory fitness.

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1. Liu J, Sui X, Lavie CJ, et al. Association of coffee consumption with all-cause and cardiovascular disease mortality. *Mayo Clin Proc*. 2013;88(10):1066-1074.
2. Liu J, Sui X, Blair SN, Lavie CJ. In reply—association of coffee consumption with all-cause and cardiovascular disease mortality. *Mayo Clin Proc*. 2013;88(12):1493-1494.
3. Cozma AI, Sievenpiper JL. The role of fructose, sucrose, and high-fructose corn syrup in diabetes. *US Endocrinol*. 2013;9(2):128-138.

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