



Contents lists available at ScienceDirect

Clinical Nutrition ESPEN

journal homepage: <http://www.clinicalnutritionespen.com>

Original article

## Coffee consumption and calcified atherosclerotic plaques in the coronary arteries: The NHLBI Family Heart Study

Yash R. Patel <sup>a,\*</sup>, Taraka V. Gadiraju <sup>a,b</sup>, R. Curtis Ellison <sup>c</sup>, Steven C. Hunt <sup>d,e</sup>,  
John Jeffrey Carr <sup>f</sup>, Gerardo Heiss <sup>g</sup>, Donna K. Arnett <sup>h</sup>, James S. Pankow <sup>i</sup>,  
J. Michael Gaziano <sup>a,j</sup>, Luc Djoussé <sup>a,j</sup>

<sup>a</sup> Division of Aging, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA, United States

<sup>b</sup> Tulane Heart & Vascular Institute, Tulane University School of Medicine, New Orleans, LA, United States

<sup>c</sup> Section of Preventive Medicine & Epidemiology, Boston University, Boston, MA, United States

<sup>d</sup> Department of Genetic Medicine, Weill Cornell Medicine, Doha, Qatar

<sup>e</sup> Cardiovascular Genetics Division, University of Utah School of Medicine, Salt Lake City, UT, United States

<sup>f</sup> Department of Radiology, Cardiovascular Medicine and Biomedical Informatics, Vanderbilt University Medical Center Nashville, TN, United States

<sup>g</sup> Department of Epidemiology, School of Public Health, The University of North Carolina at Chapel Hill, NC, United States

<sup>h</sup> Division of Epidemiology, University of Alabama, Birmingham, AL, United States

<sup>i</sup> Division of Epidemiology, University of Minnesota, Minneapolis, MN, United States

<sup>j</sup> Massachusetts Veterans Epidemiology and Research Information Center (MAVERIC) and Geriatric Research, Education, and Clinical Research Center (GRECC), Boston Veterans Affairs Healthcare System, Boston, MA, United States

### ARTICLE INFO

#### Article history:

Received 14 June 2016

Accepted 19 December 2016

#### Keywords:

Coffee consumption

Epidemiology

Atherosclerosis

Nutrition

Coronary artery calcium

### SUMMARY

**Background & aims:** While a recent meta-analysis of prospective studies reported that coffee consumption is associated with a lower risk of cardiovascular disease mortality, limited and inconsistent data are available on the relation of coffee intake with subclinical disease. Thus, the aim of the present study was to see the association of coffee consumption with the prevalence of atherosclerotic plaque in the coronary arteries in NHLBI Family Heart Study.

**Methods:** In a cross-sectional design, we studied 1929 participants of the NHLBI Family Heart Study without known coronary heart disease. Coffee consumption was assessed by a semi-quantitative food frequency questionnaire and coronary-artery calcium (CAC) was measured by cardiac computed tomography. We defined prevalent CAC as an Agatston score of  $\geq 100$  and used generalized estimating equations to calculate prevalence ratios of CAC as well as a sensitivity analysis at a range of cutpoints for CAC.

**Results:** Mean age was 56.7 years and 59% of the study subjects were female. In adjusted analysis for age, sex, BMI, smoking, alcohol, physical activity, field center, and energy intake, prevalence ratio (95% CI) for CAC was 1.0 (reference), 0.92 (0.57–1.49), 1.34 (0.86–2.08), 1.30 (0.84–2.02), and 0.99 (0.60–1.64) for coffee consumption of almost never, <1/day, 1/day, 2–3/day, and  $\geq 4$  cups/day, respectively. In a sensitivity analysis, there was no evidence of association between coffee consumption and prevalent CAC when CAC cut points of 0, 50, 150, 200, and 300 were used.

**Conclusions:** These data do not provide evidence for an association between coffee consumption and prevalent CAC in adult men and women.

© 2016 European Society for Clinical Nutrition and Metabolism. Published by Elsevier Ltd. All rights reserved.

### 1. Introduction

Coffee is consumed by 63% of adults in United States with an average consumption of 2.9 cups/day [1]. In a recent meta-analysis of 21 prospective studies, coffee consumption was associated with a lower risk of cardiovascular disease mortality, with the lowest risk

\* Corresponding author. Division of Aging, Brigham and Women's Hospital, 1620 Tremont St. 3rd Floor, Boston, MA 02120, United States. Fax: +1 617 525 7739.  
E-mail address: [dryashpatel21@gmail.com](mailto:dryashpatel21@gmail.com) (Y.R. Patel).

observed among consumers of 4 cups/day [2]. It is unclear whether coffee consumption influences subclinical disease.

Coronary artery calcium (CAC) detected by cardiac computed tomography (cardiac CT) is a subclinical marker of atherosclerosis, which predicts cardiovascular heart disease [3,4]. Limited and inconsistent data exist on the relation of coffee consumption with subclinical atherosclerosis. The Rotterdam coronary calcification study with 1570 adults found that coffee consumption of >3 to 4 cups per day was associated with lower risk of coronary calcification in women compared with three or less cups of coffee consumption per day [5]. In addition, in a cross sectional study of 25 138 young and middle-age adults, moderate coffee consumption (3 to <5 cups per day) was associated with lower prevalence of subclinical coronary atherosclerosis [6]. However, in the CARDIA study with 5115 adults aged 18–30 years, no association was found between coffee consumption of >3–4 cups and coronary calcification [7].

We sought to test the hypothesis that moderate coffee consumption is associated with lower prevalence of atherosclerotic plaque in coronary arteries in National Heart, Lung, and Blood Institute Family Heart Study (NHLBI FHS).

## 2. Materials and methods

### 2.1. Study population

The NHLBI FHS study was designed to identify and evaluate genetic and non-genetic determinants of coronary heart disease (CHD), preclinical atherosclerosis, and cardiovascular risk factors. The details of NHLBI FHS have been described in detail in prior publications [8,9]. A total of 5710 subjects underwent baseline clinical examination from 1993 to 1995. Between 2002 and 2003, about one-third of these subjects were invited to participate in a clinical examination that included measurement of CAC with cardiac CT. In addition to this, Hypertension Genetic Epidemiology Network Study, an African-American center at University of Alabama, recruited subjects that underwent cardiac CT. Amongst 3370 subjects who had data on cardiac CT, 980 subjects did not have data on coffee consumption at baseline evaluation. 279 subjects were excluded for prevalent CHD, 19 subjects were non-white. The final sample size for current analyses was 1929. Each subject gave informed consent and the study protocol was reviewed and approved by each of the participating institutions.

### 2.2. Assessment of coffee consumption

Dietary information was collected through a staff-administered semi-quantitative food frequency questionnaire developed by Willett et al. [10]. The reproducibility and validity of the food frequency questionnaire have been documented elsewhere [11,12]. Each subject was asked the following question: "In the past year, how often on average did you consume caffeinated coffee?" (Item #61 in the questionnaire forms). Possible responses were: almost never, 1–3/month, 1/week, 2–4/week, 5–6/week, 1/day, 2–3/day, 4–6/day, and >6/day. Due to sparse data, we combined adjacent categories while creating final exposure categories of almost never, <1/day, 1/day, 2–3/day, and  $\geq 4$  cups/day for stable estimates.

### 2.3. Measurement of calcified atherosclerotic plaque in the coronary arteries

Cardiac CT examinations were obtained using General Electric Health Systems LightSpeed Plus and LightSpeed Ultra, Siemens Volume Zoom, or Philips MX 8000 machines. These examinations were performed using the same protocol as employed in the

NHLBI's Multi-Ethnic Study of Atherosclerosis [13]. The details of cardiac CT examination have been reported in previous publications [9]. Cardiac CT images from all sites were sent electronically to the central CT reading center located at Wake Forest University Health Sciences, Winston Salem, NC, where trained CT analysts identified CAC in the epicardial coronary arteries using Agatston score. Agatston score refers to the amount of calcium detected by the scan based on the area and the density of the calcified plaques [14]. In this study, the sum of the vessel plaque is reported as the total CAC score. Total CAC scores from the first and second measured values were then averaged.

### 2.4. Other variables

Information on cigarette smoking and alcohol intake was obtained by interview during the clinic visit. Dietary information was obtained using a food frequency questionnaire. Level of physical activity during the previous year was estimated through self-reported data. Data on weight and height were collected with participants wearing scrub suits. Prevalent CHD was defined as a self-reported history of myocardial infarction, percutaneous transluminal coronary angioplasty, or coronary artery bypass graft. All variables used in these analyses were ascertained during the initial examination (1993–1995) except for CAC scores, which were obtained during a follow-up examination (2002–2003).

### 2.5. Statistical analysis

CAC was dichotomized into Agatston CAC score of 100+ versus less than 100, as described previously [9]. To correct for familial clustering, we used generalized estimating equations to calculate the prevalence ratios of CAC with corresponding 95% confidence interval across categories of coffee consumption. Multivariate model was adjusted for age, sex, field center, body mass index (continuous), smoking (current smoker Y/N), alcohol intake (current alcohol intake Y/N), physical activity (quartiles of total MET-min/wk), and caloric intake (continuous). All analyses were completed using SAS, version 9.3 (SAS institute Inc, Cary, NC). All *p*-values were 2-tailed and significance level was set at an alpha of 0.05.

## 3. Results

Of the total 1929 subjects, 59% were female and the mean age was 56.7 years. Median Agatston score (IQR) was 0.50 (61.5). Table 1 shows the baseline characteristics by categories of coffee consumption. Subjects who consume more coffee per day were more likely to be active smokers and alcohol drinkers, and less likely to be diabetic.

In crude analysis, higher coffee consumption was associated with higher CAC prevalence [prevalence ratio (95% CI) of: 1.0 (reference), 1.34 (0.92–1.94), 2.48 (1.81–3.40), 2.45 (1.82–3.30), and 1.81 (1.29–2.56) for coffee consumption of almost never, <1/day, 1/day, 2–3/day, and  $\geq 4$  cups/day respectively (*p* for linear trend <0.0001, Table 2)]. However, adjustment for age, sex, BMI, smoking, alcohol, physical activity, field center, and energy intake eliminated the observed association [corresponding prevalence ratios were 1.0 (reference), 0.92 (0.57–1.49), 1.34 (0.86–2.08), 1.30 (0.84–2.02), and 0.99 (0.60–1.64) respectively (*p* for linear trend, 0.44, Table 2)], with age and smoking accounting the most attenuation (Table 2). In a sensitivity analysis, there was no evidence of association between coffee consumption and prevalent CAC in either men or women, and when CAC cut points of 0, 50, 150, 200, and 300 were used.

Download English Version:

<https://daneshyari.com/en/article/5572583>

Download Persian Version:

<https://daneshyari.com/article/5572583>

[Daneshyari.com](https://daneshyari.com)