The effects of coffee on serum lipids and blood pressure in a UK population

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Summary

Data on coffee consumption were collected for 1074 adults attending for health checks in the OXCHECK study, to assess associations with serum lipids and blood pressure. Of the sample, 70.5% drank coffee, largely instant. Coffee had no significant effects on total or high-density lipoprotein (HDL) cholesterol or blood pressure, and was negatively correlated with serum triglycerides. The type of coffee drunk in the UK does not adversely effect these cardiovascular risk factors.

Introduction

There have been several reports of an association between coffee-drinking and elevated serum cholesterol. This association appears to be related to the method of coffee preparation[1]. Boiled coffee, popular in Scandinavia, has been convincingly implicated in raising cholesterol levels, but a similar effect of filtered coffee has not been consistently demonstrated. Instant coffee is the most common form in which coffee is drunk in the UK, but there are few data from population-based studies on its effect on cholesterol and other cardiovascular risk factors. We report on the relationship between coffee, serum lipids and blood pressure in a sample of participants in the OXCHECK trial of nurse-run health checks in British general practice.

Methods

Details of the OXCHECK study have been previously reported[2]. Eligible subjects, aged 35-64 at the time of randomization, were allocated to a health check during one of four 12 month periods between 1989 and 1993. At the health check details of smoking habit, diet, exercise and alcohol use were recorded. Measurement of height, weight, blood pressure and serum lipids (non-fasting) was according to standard protocols.

Between 1991 and 1992, 1074 consecutive attenders at health checks were asked to list the number of cups of coffee drunk per day on average, the type of coffee (instant or other), and whether the coffee was decaffeinated or caffeinated.

Coffee consumption was classified into five categories according to cups per day (0, 1-2, 3-4, 5-6, >6). Mean levels of total and HDL cholesterol, triglycerides,

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systolic and diastolic blood pressure were calculated separately for men and women. To test for a linear trend with increasing coffee consumption while controlling for confounding variables, a linear regression model was constructed. The dependent variables were, in turn, total cholesterol, HDL-cholesterol, triglycerides, systolic and diastolic blood pressure. The independent variables were age, body mass index (kg/m^2), dummy variables for smoking status and alcohol use, cigarettes/day (for smokers), units/week of alcohol (for alcohol users) exercise (graded 1-4 from inactive to very active), and coffee consumption by category. The regression coefficient, beta, and its 95% confidence intervals associated with coffee consumption were calculated for all forms of coffee and separately by type of coffee and caffeine content.

Results

Seven hundred and fifty-eight subjects (70.5%) reported drinking at least one cup of coffee per day, and the numbers in each category are displayed in Tables 1-2. Among coffee-drinkers, 677 (89.3%) drank instant coffee. Five hundred and forty-four (71.7%) drank caffeinated coffee, 185 (24.4%) decaffeinated and 20 (2.6%) drank a combination.

Tables 1 and 2 show mean values of serum lipids and blood pressure for men and women, by coffee category, together with the linear trend coefficient and its 95% confidence intervals. Analysis by coffee type and caffeine content did not change the results, and coffee consumption is therefore aggregated in the table. Significant negative correlations between coffee consumption and triglycerides ($P < 0.01$), and between coffee consumption and systolic blood pressure were found in men ($P < 0.03$) but not in women. In a combined analysis of men and women these correlations remained for triglycerides ($P < 0.02$) but not for systolic blood pressure ($P > 0.10$). Although there was a trend for cholesterol to be higher in coffee drinkers than non-drinkers in men, the effect of coffee was not statistically significant in either sex, nor when both sexes were combined ($P = 0.08$). High density lipoprotein-cholesterol levels showed no significant correlations with coffee consumption in men or women.

Discussion

Our data from a population-based study argue against a significant effect of the type of coffee drunk in the UK on serum cholesterol and blood pressure. Inference from observational data is potentially vulnerable to measurement imprecision and confounding from other factors, and it is therefore reassuring that two previous intervention studies[3,4] in the UK have reported similar conclusions. This finding is also in

Table 1. Mean levels and 95% confidence intervals for serum lipids and blood pressure by coffee consumption in women

	No. of cups of coffee per day					
	0	1-2	3-4	5-6	>6	Linear trend coefficient (95% CI)
	n=176 (29.53%)	n=189 (31.71%)	n=132 (22.15%)	n=64 (10.74%)	n=25 (5.87%)	
Cholesterol (mmol/l)	6.21 (6.03-6.39)	6.30 (6.13-6.47)	6.09 (5.88-6.30)	6.00 (5.75-6.25)	6.56 (6.09-7.03)	0.033 (−0.010, 0.076)
HDL-cholesterol (mmol/l)	1.42 (1.36-1.48)	1.51 (1.46-1.56)	1.41 (1.35-1.47)	1.56 (1.47-1.65)	1.41 (1.47-1.54)	0.003 (−0.010, 0.016)
Triglycerides (mmol/l)	1.83 (1.66-2.0)	1.64 (1.51-1.77)	1.62 (1.45-1.79)	1.38 (1.20-1.56)	1.74 (1.43-2.05)	−0.028 (−0.066, 0.010)
Systolic blood pressure (mmHg)	125.6 (122.8-128.4)	128.4 (125.4-131.4)	126.2 (122.9-129.5)	125.0 (119.7-130.3)	119.6 (112.6-126.6)	−0.04 (−0.74, 0.66)
Diastolic blood pressure (mmHg)	75.3 (73.6-77.0)	75.2 (73.6-76.8)	77.3 (75.3-79.3)	74.4 (71.6-77.2)	72.9 (68.9-76.9)	−0.12 (−0.54, 0.30)

$P=>0.05$

Table 2. Mean levels and 95% confidence intervals (CI) for serum lipids and blood pressure by coffee consumption in men

	No. of cups of coffee per day					
	0	1-2	3-4	5-6	>6	Linear trend coefficient (95% CI)
	n=140 (29.29%)	n=147 (30.75%)	n=91 (19.04%)	n=62 (12.97%)	n=38 (7.95%)	
Cholesterol (mmol/l)	5.95 (5.77-6.13)	6.05 (5.85-6.25)	6.08 (5.85-6.31)	6.22 (5.97-6.47	6.08 (5.75-6.39)	0.011 (−0.34, 0.056)
HDL-cholesterol (mmol/l)	1.25 (1.18-1.32)	1.19 (1.14-1.24)	1.16 (1.10-1.22)	1.28 (1.19-1.37)	1.13 (1.02-1.24)	0.004 (−0.008, 0.16)
Triglycerides (mmol/l)	2.44 (2.06-2.82)	2.27 (2.04-2.50)	2.37 (2.06-2.68)	1.98 (1.66-2.30)	2.19 (1.69-2.69)	−0.92** (−0.161, −0.023)
Systolic blood pressure (mmHg)	133.8 (130.5-137.1)	133.0 (129.7-136.3)	128.7 (124.6-132.8)	126.4 (121.9-130.9)	125.6 (120.2-131.0)	−0.83* (−1.57, −0.090)
Diastolic blood pressure (mmHg)	78.8 (76.8-80.8)	80.4 (78.2-82.6)	78.1 (75.5-80.7)	77.2 (74.5-79.9)	78.8 (75.4-82.2)	−0.17 (−0.7, 0.36)

$P=>0.05$; $*P=0.029$; $**P=0.009$

keeping with a recent meta-analysis which found no consistent relationship between coffee and incidence of coronary heart disease[5]. The negative association we found in men between coffee and both systolic blood pressure and triglycerides has been observed in other studies[1]. This offers further reassurance that the overall effect of instant coffee on cardiovascular risk is likely to be minimal.

Advice on modification of dietary and other habits from doctors and nurses is central to current strategies for improving the cardiovascular health of the population. If such strategies are to have credibility, this advice must be based on sound scientific evidence. There is no such evidence for counselling patients against drinking coffee in British general practice, and to do so may blur more important messages about the cardiovascular risks of other dietary factors.

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