

Coffee consumption and coronary heart disease mortality in Scottish men: a 21 year follow up study

Carole Hart, George Davey Smith

The effects of coffee consumption on coronary heart disease (CHD) mortality remain uncertain. Recent meta-analyses^{1,2} have produced equivocal findings, with weaker associations being seen in cohort than in case-control studies. Data regarding potential confounding factors have often been limited in these earlier studies. We have examined this issue in a large prospective study with a long follow up from the west of Scotland.

Methods and results

Between 1970 and 1973, 5766 men aged 35-64 underwent a comprehensive cardiovascular disease risk factor screening examination at workplaces in the Central Clydeside conurbation.³ Of these men, 2686 (47%) returned for a re-screening examination in 1977. On both occasions, they were asked how many cups of coffee they usually drank per day along with questions about other health related behaviours, health status, and sociodemographic factors. The men's records were flagged at the National Health Service Central Registry in Edinburgh and deaths occurring up to the end of 1994 were notified, together with their cause, coded according to *ICD*. Twenty one years of follow up were available after the first screening and 17 years after the second screening. CHD mortality (defined as *ICD* 9 codes 410-414 or 429.9) has been related to coffee drinking.

Men were grouped into five categories according to coffee consumption at the first screening (0, 1, 2, 3 or 4 and 5 or more cups per day). Additionally, the usual long-term coffee consumption of men who were re-screened was calculated by averaging the cups of coffee reported on the two occasions. This

was grouped into five categories (0, 0.5-1, 1.5-2, 2.5-4 and 4.5 or more cups per day).

At the first screening, 44% drank no coffee and only 6% drank 5 or more cups daily. Sixty five per cent of the coffee abstainers were from manual social classes whereas the coffee drinkers were more likely to be non manual workers (table 1a). Similarly, men who left school at an early age were less likely to be coffee drinkers. The mean cholesterol concentration increased and the mean diastolic blood pressure decreased in relation to the amount of coffee consumed. However, when additional adjustment was made for social class, the trend for cholesterol was not statistically significant ($p=0.27$). The percentage of current cigarette smokers was similar in each coffee category.

Fifty seven per cent of men who were re-screened remained in the same coffee drinking category at the second screening, but only 8% increased their consumption and 6% decreased their consumption by more than one category. Men who were re-screened had similar characteristics to men screened the first time.

Altogether 625 men died from CHD in the 21 year follow up period after the first screening. Cox's proportional hazards regression models were used to analyse mortality, taking those who did not drink coffee as the baseline category. Table 1 shows the relative risks adjusting for age only and for age and other risk factors.³ There was a suggestion of an increase in risk in non-coffee drinkers when adjusting for age only, although the trend was not significant, but adjusting for the other risk factors attenuated this already weak trend. Excluding deaths in the first five years produced similar results, as did not adjusting for cholesterol concentration, which could be raised by coffee

Department of Public Health, University of Glasgow, Glasgow G12 8RZ
C Hart

Department of Social Medicine, University of Bristol, Bristol BS8 2PR
G Davey Smith

Correspondence to:
C Hart, West of Scotland Cancer Surveillance Unit, Ruchill Hospital, Bilsland Drive, Glasgow G20 9NB.

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Table 1 Age adjusted risk factors and 21 year coronary heart disease (CHD) mortality in relation to coffee consumption at the first screening

	Cups of coffee per d at the first screening					Trend
	0	1	2	3 or 4	5 or more	
No of men	2547	997	965	895	362	
% manual	65	41	40	36	29	$p=0.0001$
% leaving education aged 14 or under	63	47	44	38	33	$p=0.0001$
Mean cholesterol	5.79	5.95	5.91	5.99	6.03	$p=0.0001$
Mean diastolic blood pressure	84.5	83.8	83.6	83.0	82.4	$p=0.0001$
% current cigarette smokers	59	47	53	57	61	$p=0.74$
CHD deaths	308	94	104	82	37	
Relative risk* (95% CI)	1	0.78 (0.62, 0.99)	0.88 (0.70, 1.10)	0.80 (0.62, 1.02)	0.91 (0.64, 1.28)	$p=0.27†$
Relative risk‡ (95% CI)	1	0.89 (0.70, 1.12)	0.98 (0.78, 1.23)	0.90 (0.70, 1.16)	0.96 (0.67, 1.37)	$p=0.71†$

Table 2 Seventeen year CHD mortality in relation to average coffee consumption at the first and second screenings

	Average cups of coffee per d at the 1st and 2nd screenings					Trend
	0	0.5-1	1.5-2	2.5-4	4.5 or more	
No of men	965	579	461	506	175	
CHD deaths	98	65	51	49	19	
Relative risk* (95% CI)	1	1.09 (0.80, 1.49)	1.04 (0.74, 1.47)	0.97 (0.69, 1.36)	1.23 (0.75, 2.01)	p=0.88†
Relative risk‡ (95% CI)	1	1.20 (0.87, 1.64)	1.17 (0.83, 1.65)	1.16 (0.81, 1.66)	1.49 (0.89, 2.47)	p=0.32†

* Adjusted for age. †Trend calculated by entering number of cups of coffee per day as a continuous variable. ‡Adjusted for age, diastolic blood pressure, cholesterol, smoking, social class, age leaving full time education, body mass index, angina, and ECG ischaemia

consumption and could therefore mediate rather than confound any associations. Mortality was also investigated over the 17 year follow up period after the second screening (table 2) (282 CHD deaths) and again there was no significant risk with usual coffee drinking. There was a higher risk for the small number of men whose usual consumption was over 4.5 cups per day, but this was not statistically significant ($p=0.13$).

Comment

The higher cholesterol concentrations and lower diastolic blood pressure levels among participants who drank more coffee are probably due to the characteristics of the men in each coffee category rather than the effects of coffee itself. Men who did not drink coffee were more likely to be manual workers, who have higher diastolic blood pressure and lower cholesterol, and conversely coffee drinkers were more likely to be non-manual workers with lower diastolic blood pressure and higher cholesterol concentrations.

Most coffee consumed in the UK at the time of the study was instant,⁴ unlike the findings in previous studies from outside the UK in which the coffee was more likely to be ground.^{1,2} The level of consumption was also lower in this study than others, with few men consuming 5 cups or more per day. As always in a cohort of employed men, the results may have been influenced by the "healthy worker effect", but it is difficult to see how this could have affected the association between coffee consumption and CHD. The Scottish heart health study, a general population sample conducted about 10 years after this study, found a significantly higher prevalence of CHD in people who did

not drink coffee than in those who did but concluded that there was no evidence of a causal or protective relationship between coffee consumption and CHD.⁵

It is possible that more recent coffee drinking has a more important effect on CHD than consumption reported up to 21 years previously. However, few men had changed their consumption patterns substantially when re-screened and the CHD mortality pattern was similar over the shorter period of follow up using usual long term coffee consumption, with the exception of the heaviest consumers who had an increased, though not statistically significant CHD risk.

We have found no clear evidence of an overall relationship between instant coffee use and CHD mortality, although the small number of men consuming high amounts of coffee may have limited the power of the study to detect a statistically robust effect in this group. It remains possible that other types of coffee—especially boiled coffee—may have detrimental effects on the risk of CHD, but there is still disagreement in the results from cohort studies.¹

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