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Participants who ‘eat like a King in the Morning’ have lower Cholesterol concentrations

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“Eat breakfast like a king, lunch like a prince, and dinner like a pauper” is a much heard quotation, although the evidence for this is uncertain. Meal frequency⁽¹⁾ and breakfast consumption⁽²⁾ have been associated with lower serum cholesterol and reduced rate of weight gain respectively in the Norfolk cohort of the European Prospective Investigation into Cancer (EPIC-Norfolk). However, the association between time of day of maximum energy consumption in relation to serum cholesterol concentrations was not previously studied.

The EPIC-Norfolk study started in 1993 and had 25,639 men and women, aged 40–79, who attended a health examination. Weight, height and blood samples were taken by a nurse and participants received instructions on completing a 7-day diet diary (7dDD)⁽³⁾. We excluded nightshift workers, leaving 25,295 for analysis. For every diary day, energy intake was summed and re-categorised into: morning (M), afternoon (A) and evening (E) and calculated as a proportion of the whole day. Participants’ individual diary days were scored depending whether most energy was consumed in the M, A or E. The median of the scores across days determined the type of eater a participant was (91% provided 7 days of DD). Differences between M, A and E eaters in continuous variables were tested using Kruskal-Wallis, and if significant, followed by Mann-Whitney test; proportional variables tested with Chi-squared test. Differences in cholesterol concentrations were tested using ANOVA, adjusted for sex, age, smoking, social class, physical activity and body mass index (BMI).

The majority of participants (72%) consumed most of their energy in the evening. Those who consumed the highest energy intake in the morning had significantly higher total daily energy intake. Among men, M-eaters had a higher proportion of smokers, manual occupation and were more physically active. After adjustment for sex and confounders, cholesterol concentrations for M-eaters were 5.90 mmol/L (95% CI: 5.79, 6.00), which was 0.29 mmol/L lower (95% CI: –0.40, –0.19) compared to A- and E-eaters.

Time of highest energy intake	Men (n = 11,393)							P	Women (n = 13,902)							P
	Morning		Afternoon		Evening		Morning		Afternoon		Evening					
n (%)	308	3	2,977	26	8,108	71		178	1	3,586	26	10,138	73			
Age (y)	59	9	61	10	59	9	#	58	10	62	9	57	9	#		
Energy (MJ/d)	9.9	2.8	9.3	2.3	9.5	2.2	#\$	7.5	2.2	7.0	1.7	7.2	1.6	#		
BMI (kg/m ²)	26.3	3.2	26.6	3.4	26.5	3.3	ns	26.3	4.8	26.6	4.5	26.1	4.3			
Active (%)	51		42		45		#\$	36		33		39				
Social class, manual (%)	56		42		40		#\$	39		38		39		ns		
Smoker (%)	14		10		13		#	14		9		13				
Cholesterol (mmol/L)	5.7	1.0	6.0	1.1	6.1	1.1	#\$	6.1	1.3	6.5	1.2	6.3	1.2	#		

Continuous variables are mean and standard deviation.

Significant differences ($P < 0.05$) between M&A (#), M&E (\$); ns = no overall difference (Kruskal-Wallis).

Having the highest energy intake in the morning was associated with lower cholesterol concentrations, a reduction similar to what can be achieved with dietary advice⁽⁴⁾; however, residual confounding cannot be excluded and the proportion of M-eaters was limited. Moreover, possible interactions with meal frequency will require further study.

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