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Associations between energy density of meals and snacks and overall diet quality in British adults

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Understanding how the energy density (ED) of different combinations of foods in meals and snacks influence overall diet quality is important for, for example, the development of food-based guidelines. However, virtually no research has been conducted in this area, mainly because there is no consensus about what constitutes a snack, a meal, or an eating occasion[1]. The present cross-sectional study examined how the ED of meals and snacks influence overall diet quality.

The analytic sample included 1451 British adults (659 men and 792 women) aged 19–64 years in the National Diet and Nutrition Survey. Based on data from 7-d weighed dietary record, all eating occasions were divided into meals or snacks based on contribution to total energy intake (EI) (meals: ⩾15 %; snacks: <15 %)[2]. ED (kJ/g) of meals and snacks was calculated based on solid foods only and excluding all caloric and non-caloric beverages. Overall diet quality was assessed using the Healthy Diet Indicator (HDI)[3] and Mediterranean Diet Score (MDS)[4].

While ⩾75 % of overall EI was derived from meal, ED of meals was lower than ED of snack in both men (mean (SD): 7·75 (1·33) v 9·57 (4·31) kJ/g; $P < 0.0001$) and women (mean (SD): 7·19 (1·45) v 8·10 (4·26) kJ/g; $P < 0.0001$). After adjustment for age and social class, both ED of meals and ED of snacks were inversely associated with both HDI and MDS ($P ⩽ 0.002$), but stronger associations were observed for meals relative to snacks. One-unit increase of ED of meals and ED of snacks decreased HDI by 0·25 (SE: 0·04) and 0·07 (SE: 0·01) in men, respectively, and by 0·29 (SE: 0·03) and 0·04 (SE: 0·01) in women, respectively. The corresponding values for MDS were 0·36 (SE: 0·05) and 0·09 (SE: 0·01) (men) and 0·43 (SE: 0·04) and 0·06 (SE: 0·01) (women). Similar results were obtained when meals and snacks were defined based on time of consumption (meals: 06·00–10·00, 12·00–15·00 and 18·00–21·00 hours; snacks: all others)[5] or when only acceptable reporters of EI (ratio of EI to estimated energy requirement 0·665–1·335[6]; *n* 868) were analysed.

In conclusion, increased ED of meals and to a lesser extent, snacks, was associated with lower overall diet quality in British adults, irrespective of the definition of meals and snacks. These associations suggest that overall diet quality may be improved by focusing specifically on lowering the ED of meals.

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