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The impact of evening energy intake on diet quality and body composition: a secondary analysis of the UK National Diet and Nutrition survey

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When we eat, not just what we eat may be an important aspect to consider for weight management strategies. Timing of eating can influence many physiological and metabolic processes[1], and eating more in the evening has previously been associated with increased body mass index (BMI)[2]. This study aims to explore the relationships of% energy intake (EI) consumed in the evening to total EI, diet quality, energy density, and body composition measures in a UK population.

Data from Years 5–9 (2012–2017) of the UK National Diet and Nutrition Survey (NDNS)[3] were used in this study. After under-reporters (n1349)[4] and those without body composition (n379) data were removed, EI data (estimated from 4-day food diaries) from 798 adults aged 19–64 were included for analysis. Subjects were grouped by quartiles of% EI consumed in the evening (after 18:00 (Q1 (Lowest evening EI)= <31.9%; Q2= >31.9 to 40.7%; Q3= >40.7 to 48.6%; Q4= >48.6% (highest evening EI)) and the Nutrient Rich Food Index (NRF) 9.3 was used to assess diet quality[5]. Energy density was derived by dividing EI by total grams of energy containing food and drink[6]. One-way analysis of variance (ANOVA) with Tukey's posthoc test was used to investigate the total EI difference across evening EI quartiles. Analysis of covariance (ANCOVA) controlling for age, sex and total EI was used to analyse differences in body composition, energy density and diet quality score between evening EI quartiles. For this analysis, BMI, weight, waist circumference, waist-to-hip ratio and energy density were log-transformed.

Total EI was not significantly different between evening EI quartiles. Diet quality was significantly lower in those who consumed the greatest% EI after 18:00 (Q4) (442.8 ± 87.5) than Q2 (469.5 ±84.7, $p = 0.001$) and Q3 (472.9 ± 87.5, $p = 0.002$). Energy density was higher in Q1 (5.7 ± 1.14 kJ/g) than Q4 (5.2 ± 1.41 kJ/g), $p < 0.001$. Q4 had a higher waist-to-hip ratio (0.86 ± 0.9) than all other groups and was significantly higher than Q3 (0.84 ± 0.9), $p = 0.017$. There were no significant group differences for BMI, weight or waist circumference.

In conclusion, although a difference between evening EI quartiles and BMI was not observed, those who consumed the greatest% EI in the evening (Q4) had a lower overall diet quality and greater waist-to-hip circumference, a risk factor for multiple metabolic disorders. Those who consumed the lowest% EI in the evening were observed to have the highest energy density. Timing of food intake should be considered when planning future nutritional interventions. Further analysis is now needed to examine the types of food consumed in the evening.

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