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Associations between red and processed meat consumption and cardiometabolic risk markers among British adults

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The consumption of red and processed meat has been associated with an increased risk of colon cancer[(1)]. The aim of this study was to examine the association between diets with varying levels of red meat (RM), processed red meat (PRM) and total red and processed meat (TRPM) with cardiovascular health markers in adults.

A secondary analysis was conducted using data from 1068 adults aged 19–64 years old from the National Diet and Nutrition Survey (NDNS) years 1–4 (2008/09-2011/12)[(2)]. Adults (221 men and 517 women) were classified into tertiles according to RM, PRM and TRPM consumption, with tertile 1 (T1: TRPM 0-41; RM 0-12; PRM 0-12 g /day) and tertile 3 (T3: TRPM 87-344; RM 44-225; PRM 42-284 g/day) representing diets with the lowest and highest intake of RPM, respectively. RM food group included beef, lamb, pork, lamb, burgers and other red meat and PRM included processed red meat and sausages. Intakes were obtained from 4-day diet diaries. Anthropometric measures, blood pressure, pulse pressure, plasma glucose, HbA1c, homocysteine, C-reactive protein (CRP), triacylglycerol, total cholesterol, high-and low-density cholesterol from NDNS were used to determine associations between RM, PRM and TRPM with these markers. ANCOVA was used to detect statistically significant differences between tertiles of RM, PRM and TRPM consumption and cardiometabolic risk markers controlling for age, sex, energy intake (kJ), BMI, social class and smoking status (model 1) and dietary vitamin C (biomarker of fruit and vegetable intake), SFA and total fat intakes (model 2). Bonferroni post-hoc tests were used to detect differences between tertiles. Participants with fasted blood glucose above 7 mmol/L or taking medicines known to affect blood analytes were excluded.

The diets of participants in the highest tertile of TRPM (T3) were associated with significantly higher concentrations of glucose (P-trend = 0·004, P-T2/T1 = 0·020, P-T2/T3 = 0·01), CRP (P-trend = 0·031, P-T1/T3 = 0·020) and larger waist circumference (P-trend = 0·002, P-T1/T3 = 0·029) and waist to hip ratio (P-trend = 0·005, P-T2/T3 = 0·004) compared to dietary patterns of participants in the lowest tertile of TRPM (T1) (model 1). When additional adjustments were made (model 2) T3 was associated with higher glucose concentration (P-trend = 0·001, P-T2/T1 = 0·012, P-T2/T3 = 0·004) and larger waist circumference (P-trend = 0·007, P-T1/T3 = 0·075) and waist to hip ratio (P-trend = 0·016, P-T2/T3 = 0·012) compared to T1. Diets of participants in the highest tertile of PRM (T3) were associated with significantly higher homocysteine (model 1: P-trend = 0·027; model 2: P-trend = 0·039), glucose (model 1: P-trend = 0·013; model 2: P-trend = 0·018) and HbA1c concentrations (model 1: P-trend = 0·0001; model 2: P-trend = 0·0001) compared with T1 of PRM consumption, with T3 being significantly higher (model 2) compared with T1 for homocysteine (P-T1/T3 = 0·044), glucose (P-T1/T3 = 0·018) and HbA1c (P-T2/T1 = 0·001 and P-T2/T3 = 0·001), respectively. Diets of participants in the highest tertile of RM (T3) were associated with significantly lower pulse pressure compared with T1 (Model 1: P-trend = 0·022, P-T1/T3 = 0·017; model 2: P-trend = 0·017, P-T1/T3 = 0·013). There were no other significant differences in cardiometabolic risk factors across tertiles of RM, PRM and TRPM.

This analysis suggests that consumption of TRPM (>80 g/day) are associated with higher cardiometabolic risk markers, which was driven by PRM, with RM only associated with lower pulse pressure.

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