Red and processed meat consumption and nutritional adequacy among British adults

Ditte A. Hobbs | Julie A. Lovegrove | D. Ian Givens

Introduction

Red meat is a good source of a number of nutrients such as iron, zinc and B vitamins⁽¹⁾. However, consumption of red and processed meat ($\geq 100\text{g/day}$) has been associated with an increased risk of colon cancer⁽²⁾. **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 nutritional adequacy in adults.**

Methods

Sample and study design

- This study was a secondary analysis of data from the nationally representative NDNS (2008/09-2011/12)^[2].
- This cross-sectional survey included data from 6,828 persons aged ≥ 1.5 y (of whom 2,697 were adults aged 19-64 y).

Dietary assessment

- Dietary intakes were obtained from 4-day diet diaries.
- Adults were classified into tertiles according to total red and processed meat (TRPM), red meat (RM) and processed red meat (PRM) consumption, with tertile 1 (T1) and tertile 3 (T3) representing diets with the lowest and highest intakes, respectively.
- RM - beef, lamb, pork, burgers and other red meat.
- PRM - processed red meat and sausages (includes cured and canned meats, and meats containing preservatives).

Analytical sample

- Participants with diabetes ($n=9$), fasted blood glucose above 7 mmol/L ($n=5$), taking medicines known to affect blood analytes ($n=925$) or missing data ($n=690$) were excluded. Therefore, a total number of 1068 (M $n=481$, F $n=587$) participants were included in this analysis.

Statistical analysis

- ANCOVA was used to determine statistically significant differences between tertiles of TRPM, RM and PRM consumption and macro-and micro-nutrient intakes, plasma ferritin and haemoglobin (Hb) concentrations (biomarkers of iron status) controlling for age, sex, energy intake, BMI, social class and smoking status. A P -value of ≤ 0.05 was considered statistically significant.

Results and Discussion

The mean TRPM, PRM and RM consumption was 70.3 (SD 54.0), 36.6 (SD 37.4) and 33.7 (SD 36.3) g/day, respectively. Furthermore, 56% of participants consumed less than SACN recommendations (≤ 70 g/day)⁽¹⁾ for TRPM.

Nutrient intakes of dietary patterns containing varying levels of red and processed meat

- Intakes of saturated fat, MUFA, *trans*-fat, thiamine, heme iron (dietary) and plasma Hb concentration were significantly higher in diets of participants in the high TRPM, RM and PRM tertiles (T3), respectively (all $P < 0.05$).
- In addition, protein, niacin, iron and zinc intakes were significantly higher for T3 compared with T1 for TRPM and RM, respectively (all $P < 0.05$).

- Total fat and sodium intakes were higher for T3 compared with T1 for TRPM and PRM, respectively (all P -trend=0.0001).
- Carbohydrate, vitamin E, biotin and manganese intakes were significantly lower for TRPM, RM and PRM, respectively (all $P < 0.05$).
- Calcium and iodine intakes were significantly lower for TRPM (calcium: P -trend=0.009; iodine: P -trend=0.0001) and RM (calcium: P -trend=0.001; iodine: P -trend=0.0001), respectively.
- Vitamin B12 (P -trend=0.019), iron (P -trend=0.002), non-haem iron (P -trend=0.0001) and selenium (P -trend=0.006) intakes were significantly lower for T3 compared with T1 for PRM.

Percentage of subjects below the lower recommended nutrient intake (LRNI)

- Figure 1 shows the percentage of subjects not meeting the LRNI for selenium, zinc, iron, potassium, magnesium and vitamin B₆.

FIGURE 1 The percentage of subjects below the LRNI

- The percentage of participants not meeting the LRNI were lower for high TRPM (T3) compared with low TRPM consumers (T1) for iron (27 vs. 3%), zinc (11 vs. 1%), selenium (49 vs. 11%) and vitamin B₆ (13 vs. 1%).

Conclusion

This study suggests that around half (56%) of the UK population has TRPM intakes that are in line with current recommendations (≤ 70 g/day). Diets containing higher tertiles of RM (mean 77.8 g/day (SD 32.4)) have an overall better micro-nutrient profile compared with diets containing high PRM (mean 75.9 g/day (SD 32.0)). Furthermore, dietary patterns that contain lower tertiles TRPM (mean 18.4 g/day (SD 14.9)). may have implications for iron, zinc, vitamin B₆ and selenium intakes and status in British adults.

References

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Contact information

- Department of Food & Nutritional Sciences, University of Reading, Whiteknights, RG6 6AH
- Email: d.a.hobbs@reading.ac.uk | www.reading.ac.uk/nutrition