SUBSTITUTION OF PROCESSED MEAT FOR FISH OR POULTRY AND THE IMPACT ON HYPERTENSION IN THE FRENCH E3N COHORT

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OVERVIEW

High processed meat consumption has been shown to be associated with the development of hypertension in previous studies (1). In this study, we aimed to investigate if replacing processed meat with fish or poultry may be associated with a lower risk of hypertension in the French E3N cohort.

METHODS

The E3N prospective cohort

Initiated in 1990 and comprising 98,995 French women born between 1925 and 1950, questionnaires have been sent to E3N women every 2 to 3 years to ask them about their lifestyle and their state of physical and mental health.

Dietary assessment

Self reported in 1993 and 2005.
Dietary data was collected through responses to validated 238 item questionnaires on participants' diet history.
Main exposure: processed meat (sausage, ham, charcuterie & paté)
Potential replacement foods: fish (fatty + lean) and poultry.
The unit 1 serving / week (150 g / week) was chosen, as this amount reflected the usual serving of meat or fish.

Hypertension ascertainment

Self reported since 1993.
After 2004, to assess the accuracy of the self-reported data, a comparison of self-reported hypertension to reimbursement of antihypertensive drugs was performed, finding an agreement 82%.

Study population and follow-up time

After exclusion of participants with prevalent hypertension, with no reported meat or fish intake, and reporting the highest and lowest 1% of caloric intake, we included 45,771 women.

STATISTICAL ANALYSES

Descriptive analysis

Characterize participants based on their consumption of processed meat at baseline (cases / non cases) by:
1) Quantitative variables = mean and standard deviation.
2) Qualitative variables = frequency values.

Risk analysis

Hazard ratio for incident hypertension were calculated by Cox proportional hazards regression models using participant age as the timescale, and processed meat as the main exposure.
Adjustment variables: BMI, physical activity (METs-h/week, continuous), total calories (KCAL, continuous), smoking status (smoker, ex-smoker, never smoker), education level, family history of cardiovascular disease, and prevalent diabetes.
The construction of the specified substitution models (2) at a single time point is based on the partition method, as this method explains the substitution by subtracting the regression coefficients of the substituted foods.
Boostrapping with 100 samples was used to estimate 95% CI for the substitution.
i.e. $\beta_{.\,processed\ meat\ for\ fish} = \beta_{fish} - \beta_{processed\ meat}$

RESULTS

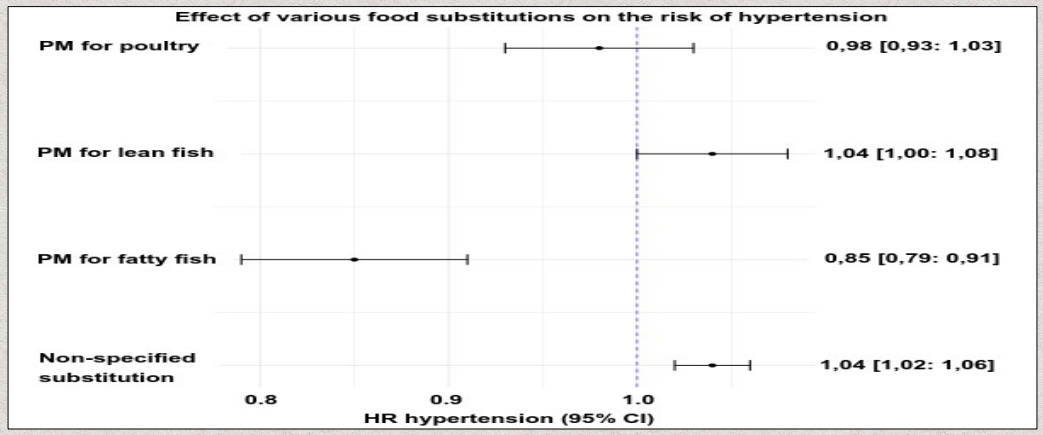
Baseline characteristics of participants

During an average follow-up of 18.3 years, among the 45,771 women included in the study, 12,327 women reported a hypertension diagnosis.
Comparing women at baseline according to their consumption of processed meat, those consuming PM more were slightly younger, more likely to be smokers, were less highly educated, had a higher BMI and total energy intake. Those women consuming more processed meat also consumed more eggs, white meat, red meat, more alcohol, and less fish.

Relation between processed meat and hypertension

After adjusting for potential confounding factors, we found that the risk of incident hypertension was higher in women who consumed more than 5 servings of processed meat a week compared with those who consumed less than 1 serving of processed meat a week (HR: 1.23; 95%: 1.01, 1.48).

Association between the substitution of fish or poultry for processed meat and the hypertension risk



Non specified substitution analyses showed that increasing processed meat by 1 serving/week, whilst equivalently reducing by a weighted average other non-specified foods was associated with a 13% increased risk of hypertension (HR: 1.04; 95% CI: 1.02, 1.06).
Replacement of processed meat for fatty fish was associated with a reduced risk of hypertension, whereas weaker evidence was observed for replacement of processed meat with poultry, or with lean fish, perhaps due to side-foods eaten in association with these food.

DISCUSSION

Replacement of processed meat for fatty fish was associated with a reduced risk of hypertension, whereas weaker evidence was observed for replacement of processed meat with poultry. These results may help inform healthier food choices for those wishing to reduce their consumption of processed meat.
Although several demographic, lifestyle and dietary factors have been controlled, the cause-effect relationship of the observed association between processed meat consumption and hypertension is still not guaranteed due to residual confounding and unmeasured confounders.
Our study participants are all French women and most of them are highly educated, have BMI < 25 kg/m², consume low amounts of meat, fish, and more vegetables, and also have a fairly high level of exercise intensity. It is possible that the results will be different to studies performed in other populations from other countries with a different diet.

CONCLUSION

Replacing processed meat for fatty fish was associated with a reduced risk of hypertension.

REFERENCES

1) Lajous, Martin, et al. "Processed and unprocessed red meat consumption and hypertension in women." The American journal of clinical nutrition 100.3 (2014): 948-952.

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