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Moderate consumption of marine n-3 fatty acids is associated with a lower risk of atrial fibrillation – a Danish cohort study

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Purpose

Some studies have reported a beneficial effect of fish intake with respect to development of atrial fibrillation (AF), but results have been inconsistent. The aim of this study was to examine the hypothesis of a negative association between consumption of marine n-3 polyunsaturated fatty acids (PUFA) and the development of AF.

Methods

A total of 57,053 Danish participants 50 to 64 years of age were enrolled into the Diet, Cancer, and Health Cohort Study between 1993 and 1997. Baseline data included information on health, medication, lifestyle, and a semi-quantitative food frequency questionnaire including 20 questions regarding intake of fish and food products containing fish, as well as measurements of anthropometry, blood pressure, and blood samples. Follow-up was done using the National Patient Registry, which records diagnoses from in-patient and out-patient hospital visits in Denmark. The validity of the diagnosis AF was high with a positive predictive value of 92.6 %. Data was analysed in a pre-specified, sex-stratified, multivariate Cox regression model with age as the time axis and modelling risk according to a restricted cubic spline of n-3 PUFA consumption, which allows modelling non-linear associations. As a supplement, quintiles of n-3 PUFA consumption were explored.

Results

During 13.6 years of follow-up, a total of 3,425 incident cases of AF were registered. In multivariate analyses, the association between consumption of n-3 PUFA and risk of incident AF was U-shaped with the lowest risk of AF at moderate amounts of intake near the median consumption in this population (0.63 g/day) (Figure 2). Similarly, when comparing quintiles of n-3 PUFA intake, a 13% significantly lower risk of incident AF was seen in the middle quintile (Q3) compared to the lowest quintile of intake (Table 1).

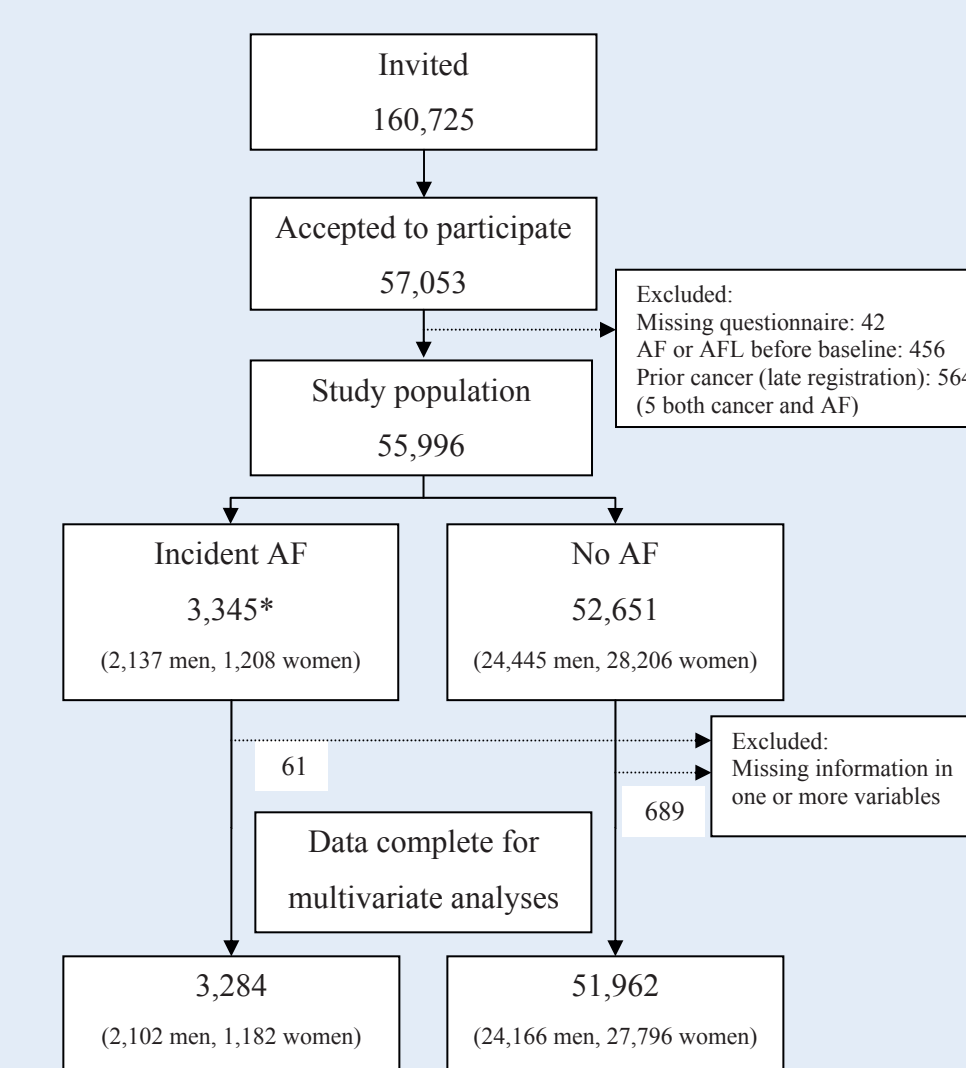


Figure 1. Flowchart of participants in the Diet, Cancer, and Health Cohort Study and incident diagnosis of atrial fibrillation (AF) recorded in the Danish National Patient Registry. * 3,425 incident cases of AF were registered, but for reducing possible misclassification a diagnosis recorded from the emergency room was discarded if the patient was admitted to an in-hospital stay on the same date.

Table 1.

Quintiles of dietary intake of marine n-3 PUFA and risk of incident atrial fibrillation

| | | Crude | | | Adjusted* | | |
|----|-----------------|--------|-----------|------|-----------|-----------|------|
| | HR | 95% CI | p | HR | 95% CI | p | |
| Q1 | <0.39 g/day | 1 | - | 1 | - | - | |
| Q2 | 0.39-0.53 g/day | 0.92 | 0.82-1.02 | 0.14 | 0.91 | 0.81-1.02 | 0.12 |
| Q3 | 0.54-0.73 g/day | 0.87 | 0.77-0.97 | 0.02 | 0.87 | 0.78-0.98 | 0.02 |
| Q4 | 0.74-0.99 g/day | 0.95 | 0.85-1.07 | 0.40 | 0.96 | 0.86-1.07 | 0.49 |
| Q5 | >0.99 g/day | 1.06 | 0.95-1.18 | 0.30 | 1.03 | 0.92-1.15 | 0.60 |

PUFA indicates polyunsaturated fatty acids; HR, hazard ratio; CI, confidence interval and Q, quintile.
* Adjusted for hypertension, systolic blood pressure, body-mass index, waist circumference, smoking, alcohol intake, years in school, hypercholesterolemia and/or cholesterol treatment, total serum cholesterol, angina pectoris, diabetes mellitus, myocardial infarction (time-varying covariate), and heart failure (time-varying covariate).

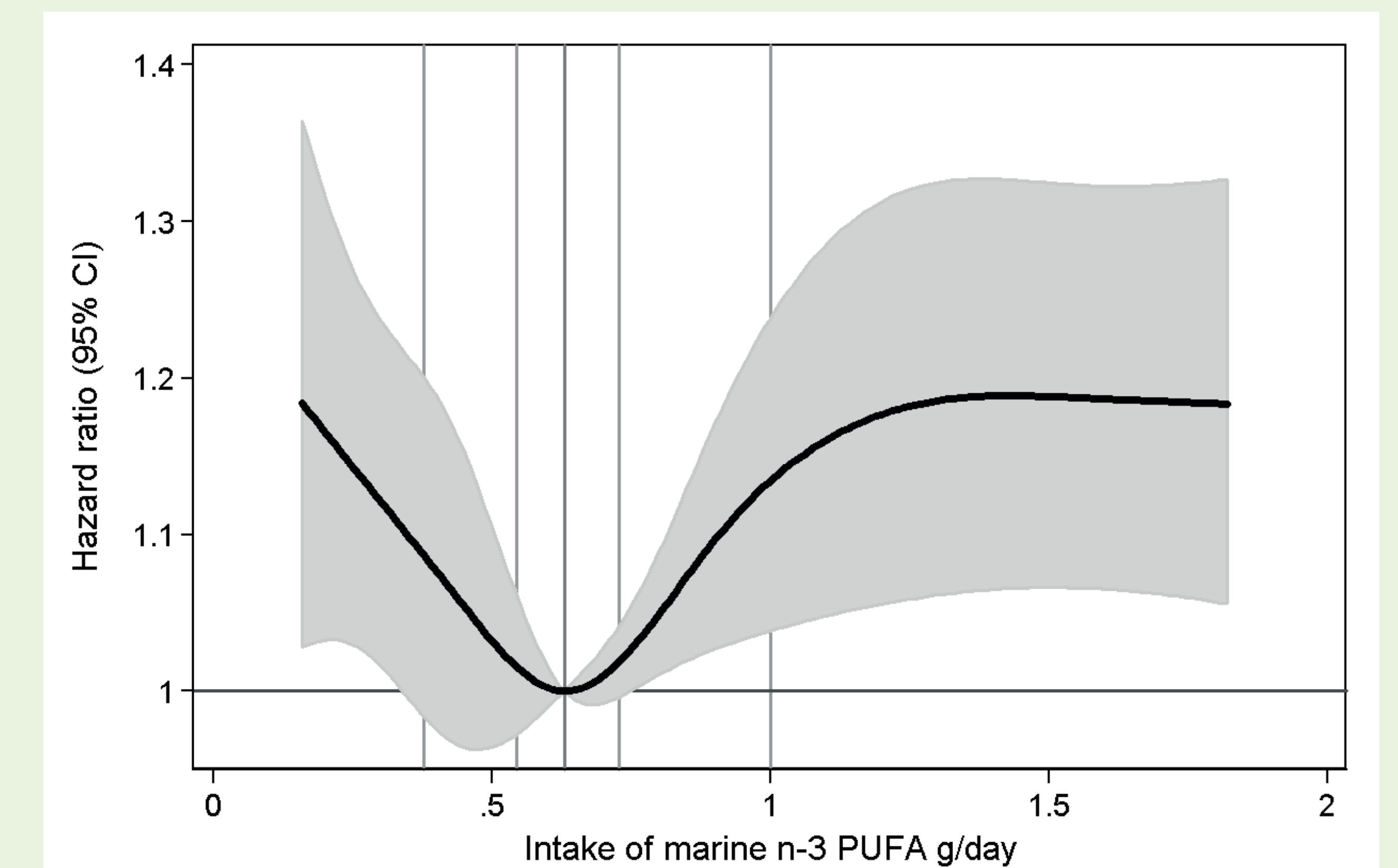


Figure 2. Dietary consumption of total marine n-3 polyunsaturated fatty acids (PUFA) and risk of incident atrial fibrillation. Median intake as reference (dark grey vertical line). The 20, 40, 60, and 80 percentiles of intake are marked by vertical lines (light gray). Shaded grey area shows the 95% confidence interval for the hazard ratio for AF (black curve). Only the 2.5 to 97.5 percentile of exposure is shown.

Conclusions

Moderate consumption of marine n-3 PUFA close to the median intake in this cohort was associated with a significantly lower risk of incident AF compared to both lower and higher levels of intake.