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Contribution of cod liver oil supplements to intake and associations with biomarkers of fatty acids in the European Prospective Investigation into Cancer (EPIC-Norfolk) Study

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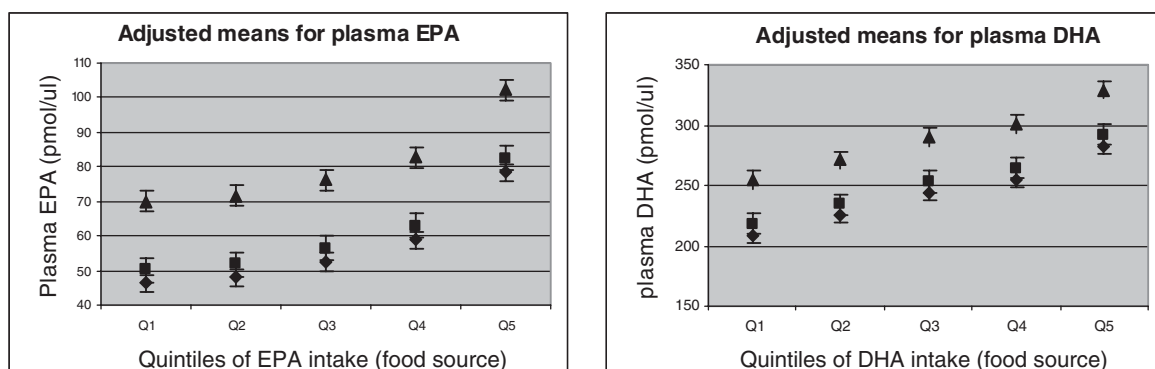
Supplements contribute to nutrient intakes and are used by 34% of men and 46% of women participating in the European Prospective Investigation into Cancer in Norfolk (EPIC-Norfolk)⁽¹⁾. As cod liver oil (CLO) supplements are the most frequently consumed group, this cross-sectional study aimed to assess their contribution to nutrient intakes, (EPA, DHA and vitamins A and D) and to determine whether inclusion of supplement data improved the association between nutrient intake and corresponding biomarkers, i.e. blood plasma concentrations of EPA and DHA.

EPIC-Norfolk is a prospective cohort study investigating determinants of chronic diseases in free-living individuals, aged 40–79 years, recruited from the general population between 1993 and 1998⁽²⁾. Participants filled in a 7-d diet diary^(3,4), in which they also recorded their dietary supplement use⁽¹⁾.

Chi-square tests indicated that supplement use increased with age in men only ($P_{\text{trend}} < 0.001$) and that the proportion of CLO containing supplements increased with age for men and women ($P_{\text{trend}} < 0.001$). Median nutrient intake increased after inclusion of supplement sources (Table); and resulted in a shift in the quintile distribution for 18–26% of the participants for fatty acids and for 36–51% of the participants for vitamins A and D.

	Men (n 8706)				Women (n 9912)			
	Food only		Food + suppl intake		Food only		Food + suppl intake	
	Median	IQR	Median	IQR	Median	IQR	Median	IQR
EPA (g/d)	0.06	0.03–0.15	0.07	0.03–0.18	0.05	0.02–0.13	0.06	0.03–0.15
DHA (g/d)	0.08	0.04–0.22	0.09	0.04–0.26	0.07	0.03–0.20	0.08	0.04–0.23
Vitamin A (mcg/d)	394	266–607	516	311–1073	305	210–459	444	254–1040
Vitamin D (mcg/d)	3.19	2.09–4.79	3.96	2.41–6.35	2.52	1.67–3.79	3.55	2.03–5.83

Participants were divided into three groups: non-supplement users (NSU◆), supplement users not using CLO (SU-CLO■) and SU using CLO (SU+CLO▲). In participants with blood plasma concentrations (n 3371 men, n 3174 women), ANOVA showed higher plasma levels for EPA (40%) and DHA (19%) for the SU+CLO compared with NSU, after correcting for quintiles of food sources of respective fatty acids ($P < 0.001$, Figure).



Consumption of supplements contributed to intakes of EPA, DHA and vitamins A and D and had substantial effects on classification of individuals within this population distribution. The association between intake and plasma fatty acids were similar for SU and NSU, but the absolute values for SU were higher, demonstrating the contribution supplements make. Omitting data for intakes from supplements could be a source of error in diet and disease associations.

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