

Brief report

Associations between cod liver oil use and symptoms of depression: The Hordaland Health Study

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Abstract

Background: Clinical trials suggest that omega-3 fatty acids improve the outcome of depression. This study aimed to evaluate the association between intake of cod liver oil, rich in omega-3 fatty acids, and high levels of symptoms of depression and anxiety in the general population.

Methods: We used data from the "The Hordaland Health Study '97–'99" (HUSK), a population based cross-sectional health survey from Norway including 21,835 subjects aged 40–49 and 70–74 years. Symptoms of depression and anxiety were measured by The Hospital Anxiety and Depression Scale (HADS). We used logistic regression to study associations.

Results: Among the participants, 8.9% used cod liver oil daily. A total of 3.6% had high levels of depressive symptoms. The prevalence of such depressive symptoms among the subjects who used cod liver oil daily was 2.5%, as compared to 3.8% in the rest of the population. The users of cod liver oil were significantly less likely to have depressive symptoms than non-users after adjusting for multiple possible confounding factors (odds ratio=0.71, 95% confidence interval 0.52 to 0.97). These factors included age, gender, smoking habits, coffee consumption, alcohol consumption, physical activity, and education. In addition, we found that the prevalence of high levels of depressive symptoms decreased with increasing duration (0–12 months) of cod liver oil use (multivariate adjusted test for trend, $P=0.04$). We were only able to study this latter association in a subset of the population aged 40–46 years.

Limitations: Data are cross sectional.

Conclusions: The findings indicate that regular use of cod liver oil is negatively associated with high levels of depressive symptoms in the general population.

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Keywords: Omega-3; Cod liver oil; Depression

1. Introduction

Depression is a common disorder with complex etiology. At any time, it affects 2% to 6% of the population in the United States (Kessler et al., 2005) and has a major impact on public health. Hence, identifying risk

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modifying factors for depression is an issue of high importance.

Biological marker studies have indicated that people with depression have deficits in omega-3 fatty acids (Parker et al., 2006). A few previous studies have suggested that frequent consumption of fish may reduce the risk of depression (Hibbeln, 1998; Tanskanen et al., 2001) while others have not found this (Hakkarainen et al., 2004). The possible protective effect might be related to the omega-3 fatty acids content in fish (Smith, 1991; Hibbeln, 1998; Maes and Smith, 1998) and clinical evidence from short-term trials supports the notion that omega-3 supplementation in addition to standard pharmacological treatment improves the outcome for depression (Stoll et al., 1999; Nemets et al., 2002; Peet and Horrobin, 2002; Su et al., 2003), but others have not found this (Silvers et al., 2005). This may be due to a variation in the dosage of omega-3 administered or to the content of docosahexaenoic acid (DHA) versus eicosapentaenoic acid (EPA) in the omega-3 oil which were used (Sontrop and Campbell, 2006). Cod liver oil is rich in omega-3 fatty acids and, to our knowledge, no studies have so far explored the association between regular use of cod liver oil and symptoms of depression in a community sample.

The aim of the present study was to investigate the association between the use of cod liver oil and depressive symptoms in a general population. Since anxiety is closely related to depression, anxiety symptoms were also studied.

2. Methods

2.1. Study population and questionnaire

The Hordaland Health Study '97–'99 (HUSK) is a cross-sectional health survey that was conducted from 1997 to 1999 and included all individuals in Hordaland County in Norway born between 1953 and 1957 (29,400 subjects). In addition, the study included 4849 subjects born between 1950 and 1951 and 4338 subjects born between 1925 and 1927, who had participated in an earlier study in the same area from 1992 to 1993 (The Hordaland Homocysteine Study). Of 25,634 recruited participants (66.4% of eligible), 21,835 completed the anxiety–depression part of the questionnaire and were included in our study. The overall aim of the HUSK health survey was to collect population data for the purposes of identifying diseases and risk factors in general that potentially could be modified by intervention, and to estimate the prevalence and characteristics of such different conditions. All participants in the

HUSK study gave informed consent. The study protocol was approved by the Regional Ethics Committee and by the Norwegian Data Inspectorate.

The questionnaire was delivered to each participant in person, and the participants returned it by mail. The questionnaire provided information on a large number of health behaviors, somatic- and psychiatric symptoms and demographic factors. Use of cod liver oil was assessed in two ways: First the subjects were asked to list the medications they had taken the day before the assessment, including vitamins and dietary supplements and to mark whether they used each drug daily or not. The second question (only presented to subjects born between 1953 and 1957) asked if the subjects had been using cod liver oil during the last year, and further asked the subjects to report the number of months they had been using it. A total of 13,262 of the subjects born between 1953 and 1957 (83.5%) answered this question. We categorized the duration of cod liver oil use into 4 months intervals, to obtain approximately the same number of subjects in each category. High levels of symptoms of and anxiety were measured by The Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983; Bjelland et al., 2002). High levels of depressive symptoms were defined as a HADS-D score ≥ 8 and a HADS-A score < 8 , while high levels of anxiety symptoms were defined as a HADS-A score ≥ 8 and a HADS-D score < 8 . Analyses were also carried out on cases with high symptoms of combined depression and anxiety, defined as subjects with both subscale scores ≥ 8 .

2.2. Assessment of covariates

Age was divided into two groups consisting of those born 1950 to 1957 and those born 1925 to 1927.

Smoking habits, consumption of coffee and alcohol, physical activity and education were categorized into three categories each (Table 1).

2.3. Statistical analyses

We used logistic regression models to estimate odds ratios with 95% confidence intervals for high levels of symptoms of depression and anxiety, predicted by either daily use versus non-daily-use of cod liver oil or by “duration of cod liver oil use” the last year. We coded “duration of cod liver oil use” as a linear variable to test for a linear relationship between duration of cod liver oil use and the outcome variables (test for trend), and as an indicator variable to allow for analysis of a non-linear dose–response relationship.

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