Validation of a meta-analysis: the effects of fish oil in rheumatoid arthritis


Authors' objectives
To validate the results of a meta-analysis showing the efficacy of fish oil in rheumatoid arthritis with the results of a re-analysis of the complete primary data set.

Searching
MEDLINE was searched using 'fish-oil', 'rheumatoid arthritis' and 'randomised controlled trials' as search terms. The bibliographies of identified papers and reviews were scanned, and authors and suppliers of fish oil were contacted for published and unpublished studies on the subject.

Study selection
Study designs of evaluations included in the review
Randomised, double-blind placebo-controlled trials were included.

Specific interventions included in the review
Dietary marine fish oil supplementation.

Participants included in the review
Patients with rheumatoid arthritis (n=408) were included.

Outcomes assessed in the review
The use of at least one of: tender joint count, swollen joint count, morning stiffness, grip strength, patient/physician global assessment or visual analogue scale.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection. Studies had to report results for the placebo and treatment groups at baseline and follow-up.

Assessment of study quality
The method of Chalmers et al. (see Other Publications of Related Interest no.1) was used for assessing the quality of a randomised controlled trial (RCT). The scores for each study were summed into an overall quality score. Two raters scored each paper independently and any differences were resolved by discussion. Raters were blinded to authors’ names, journals, year and location of study. The treatment and control groups were also blotted out and randomly designated by letters.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction. Data were collected on demographic and outcome variables. For the reanalysis of primary data, the same variables were abstracted for individual patients (data were available for 395 participants).

Methods of synthesis
How were the studies combined?
For each outcome (within each study) a rate difference and its standard deviation was obtained and pooled using the method of DerSimonian and Laird (see Other Publications of Related Interest no.2).

How were differences between studies investigated?
A chi-squared test of heterogeneity was carried out for each outcome measure. In the reanalysis the following co-variates were explored as possible sources of heterogeneity: age, sex, duration of disease, rheumatoid factor positivity and number of medications utilised.

Results of the review
Ten studies in total: 8 parallel (n=352), 1 crossover (n=14) and 1 crossover/parallel (n=42). In the meta-analysis using effect sizes from group means, only 9 studies were included as one study did not provide data on the placebo group (it subsequently became available for the reanalysis using primary data).

The tests of heterogeneity were non significant for each outcome measure. Statistically-significant improvements at 3 months were found in tender joint count (rate difference, RD = -2.9; 95% confidence interval, CI: -3.8, -2.1, p<0.0010) and duration of morning stiffness (RD = -25.9; 95% CI: -44.3, -7.51, p<0.01) in the fish oil group compared with heterogeneous dietary control oils. Improvements in other measures were found in the fish oil group but none were statistically significant.

Reanalysis of the primary data confirmed a significant reduction in tender joint count (p<0.001) and in morning stiffness (p<0.02) but not in any of the other outcome measures. Demographic factors (age and rheumatoid factor status) were found to reach statistical significance for both tender joint count and morning stiffness (p<0.05).

Authors’ conclusions
The meta-analysis revealed a modest, statistically-significant improvement in tender joint count and morning stiffness in patients treated with dietary fish oil supplementation for 3 months. These conclusions were supported by reanalysis of the complete primary data set and were relatively invariant to statistical modelling techniques.

CRD commentary
Since the dates are not given for the MEDLINE search it is unclear whether all relevant studies have been included. The inclusion and exclusion criteria applied were explicit. The authors reported that the quality assessment scores were similar between studies, but they ranged from 25 to 50.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.