Long-term efficacy of high-protein diets: a systematic review
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CRD summary
The review found no conclusive evidence that a high protein diet is better for weight loss than a standard, high monounsaturated fat or high carbohydrate diet. These conclusions appeared to be supported by the data but it was difficult to assess their reliability due to the low quality of the evidence and poor reporting in the review.

Authors' objectives
To assess the long-term efficacy of high protein diets for weight loss in adults.

Searching
PubMed, EBSCO and SciELO were searched for studies in English or Spanish. Search terms were reported.

Study selection
Eligible studies were randomised controlled trials (RCTs) conducted among adults that compared a high protein diet versus a conventional energy-restricted, high fat or high carbohydrate diet. Studies were required to specify either the amount of energy from macronutrients or the total weight of protein in grams in the diet. Studies needed to report weight or body mass index at baseline and at the end of the intervention. Intervention or follow-up periods needed to be at least 24 weeks.

The age of participants in the included trials ranged from 18 to 70 years. Body mass index ranged from 25 to 43kg/m². Two studies included only women. In high protein diets, the protein component ranged from 25% to 40% and the carbohydrate component from 4% to 45%. Controls received a standard, high carbohydrate, high fat or high monounsaturated fat diet. Intervention durations ranged from six to 24 months.

The authors did not state how many reviewers performed the selection.

Assessment of study quality
Participant retention rate, use of intention-to-treat analysis and use of a power calculation were reported for each study.

The authors did not state how the quality assessment was performed.

Data extraction
Data were extracted on changes in body weight from baseline in the two groups of each study, with p values for differences between the groups.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
The study findings were combined in a narrative synthesis.

Results of the review
Eight RCTs were included (645 participants, sample range 50 to 119). Participant retention ranged from 34% in the longest study (24 months) to 92% in a six-month study. Only three of the studies had retention of more than 75%. Only one study reported intention-to-treat analysis. Five studies reported a power calculation.

Mean weight loss across all studies was 6.3kg in the high-protein group and 5.0kg in controls. One study was apparently an outlier, with reported losses of 11.3kg in the high-protein group and 9.4kg in the standard diet group. In RCTs that favoured the high-protein intervention, the change in the high-protein group ranged from a loss of 3.7kg more than controls in a six-month study to loss of 1.2kg more than controls in a 17-month study. One of the four studies with a duration of 15 months or more found that a high protein diet was associated with significantly higher weight loss than a high fat diet (p<0.01) and the other three found no statistically significant difference in weight change between groups.
receiving a high protein, high carbohydrate (one study) or standard diet (two studies). However, retention was low in these studies (34% to 74%).

No adverse effects of high protein diets were reported in any of the studies.

**Authors’ conclusions**
There is no conclusive evidence that a high protein diet was better for weight loss than a standard, high monounsaturated fat or high carbohydrate diet.

**CRD commentary**
The objectives and inclusion criteria of the review were clear and relevant sources were searched for studies. The search was restricted by language and no specific efforts to retrieve unpublished studies were apparent so the review may have been at risk of language and publication biases. Search dates were not reported. It was unclear whether appropriate steps were taken to minimise the risk of reviewer bias and error during study selection, quality assessment and data extraction. Important aspects of quality (such as methods of sequence generation and allocation concealment) were not reported. From the information provided it appeared that study quality was generally poor, with low rates of retention and inadequate duration of follow-up. Methods for pooling studies were not discussed in the methods section and it was unclear whether statistical pooling of data from studies with similar characteristics may have been feasible. No confidence intervals or other measures of variability were reported in the review. It was unclear whether adverse events were absent or unreported. As the authors noted, the review was limited by the small number of studies with follow-up of a year or more and by inconsistency in study findings.

The authors’ conclusions appeared to be supported by the data but it was difficult to assess their reliability due to the low quality of the evidence and poor reporting in the review.

**Implications of the review for practice and research**

**Practice:** The authors stated that a well designed, conducted and supervised standard diet might achieve higher weight loss than a high protein diet.

**Research:** The authors stated a need for long-term studies of high protein diets for weight loss. Such studies required adequate statistical power, use of intention-to-treat analysis and a high retention rate. They suggested that studies should also investigate the potential adverse effects of high protein diets on mineral and vitamin levels and the effects of a constant state of lipolysis.

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