Guar gum for body weight reduction: meta-analysis of randomized trials

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Authors' objectives
To determine the efficacy of the dietary fibre guar gum as a therapeutic option for reducing body weight, by conducting a meta-analysis of randomised controlled trials (RCTs).

Searching
MEDLINE, EMBASE, BIOSIS Previews, AMED and the Cochrane Library (from database inception to December 2000) were searched using the search terms: 'guar gum', 'jaguar gum', 'Indian cluster bean', 'C. tetragonolobus' and 'Indische Buschelbohne'. The authors also contacted manufacturers of commercial guar gum preparations and experts in the field, and scanned their own files for additional information. The bibliographies of retrieved papers were also scanned. No language restrictions were reported.

Study selection
Study designs of evaluations included in the review
Double-blind RCTs were included. Seven trials were of a crossover design and four trials were of a parallel design.

Specific interventions included in the review
Dietary fibre guar gum monopreparations (granulated, flour or bars; 6.6 to 39.6 g/day) compared with placebo. Relevant interventions with concomitant medication or dietary interventions were excluded from the review.

Participants included in the review
Patients with hypercholesterolaemia, hyperlipidaemia, type 1 and 2 diabetes, healthy volunteers and menopausal women. The participant characteristics were not reported.

Outcomes assessed in the review
The outcomes assessed were the mean change of body weight compared with baseline, and adverse events.

How were decisions on the relevance of primary studies made?
Two reviewers read the papers and performed the study selection according to predefined criteria.

Assessment of study quality
Validity was assessed using the Jadad 3-item, 5-point scale (see Other Publications of Related Interest). Two reviewers independently performed the validity assessment and any discrepancies were settled through discussion.

Data extraction
Two reviewers independently performed the data extraction in a standardised manner according to predefined criteria. Any discrepancies were settled through discussion.

The authors used an assumption to impute the variance of the change in most studies.

Data were extracted for the categories of: study identification, quality score, study design, duration, main diagnosis, sample size, type of guar gum, daily dose and outcomes.

Methods of synthesis
How were the studies combined?
Pooled weighted mean differences (WMD) with 95% confidence intervals (CIs) were calculated using a random-effects
Publication bias was assessed using a funnel plot analysis.

How were differences between studies investigated?
The chi-squared statistic was used to test for homogeneity. Sensitivity analyses were performed:

for trials with similar methodological features (6 trials using 15 to 21 g of the same type of guar gum over treatment periods ranging from 3 to 6 months);

following removal of the largest trial; and

for trials offering dietary advice or in which the usual diet was maintained.

Results of the review
Twenty RCTs with 394 participants were included in the review. Eleven trials (203 participants) were combined in the meta-analysis of weight difference and 20 trials were included in the adverse events analysis.

A meta-analysis of 11 trials indicated that there was no statistically-significant difference in patients receiving guar gum compared with those receiving placebo (WMD -0.04 kg, 95% CI: -2.2, +2.1).

The chi-squared test for homogeneity indicated no heterogeneity (p>0.2).

The sensitivity analysis (6 trials) did not change the findings (WMD -0.3 kg, 95% CI: -4.0, +3.5). Removal of the one large trial resulted in a WMD of -0.2 kg (95% CI: -3.5, +3.0). The dietary advice analysis reported no change in the results.

The adverse events (reported in 17 of 20 trials) most frequently reported were gastrointestinal complaints (flatulence, diarrhea, abdominal pain and cramps). Eleven patients dropped out owing to adverse events.

The funnel plot analysis was inconclusive owing to the small number of studies.

The quality scores ranged from 2 to 4 points.

Authors’ conclusions
The authors state guar gum is not efficacious for reducing body weight. Considering the adverse events associated with its use, the risks of taking guar gum outweighs its benefits for this indication. Therefore, guar gum cannot be recommended as a treatment for lowering body weight.

CRD commentary
The authors stated their review question clearly. The inclusion criteria were stated but details were lacking. The authors stated that they were excluding dietary interventions, but they then included dietary advice interventions in the meta-analysis and one of the sensitivity analyses. Crossover studies were included, but the authors did not state from which stage of the studies the data were taken. Without participant characteristics it is not possible to determine whether the included participants could benefit from the interventions (e.g. whether overweight or not), and whether their characteristics would interact with the interventions (e.g. insulin interaction with guar gum).

The literature search appeared to be thorough and sought unpublished and expert information on the topic. The search was not limited to English language articles. A funnel plot analysis was performed to assess publication bias, although the results of this analysis were unclear.

The quality of the included studies was assessed using a validated scale. The results were reported in the data extraction tables, but were not made use of in the review analyses. The authors reported who performed the study selection, validity assessment and the data extraction processes.
Details of the studies were tabulated, but they were lacking in terms of the numbers in each group, participant characteristics and aims of the included studies (only one study states that it was looking at weight loss as a primary outcome). The authors have also made errors in reporting mg, rather than g, in one set of data.

Pooling may not have been appropriate based on the characteristics of the participants and studies. Pooling did not group by diagnosis. The authors may have over-relied on an assumption to calculate the weight of the included studies. The forest plot could have shown more detail, e.g. sample size, and weighting. Heterogeneity was assessed and reported, and further sensitivity analyses were performed. The authors also discussed methodological limitations of the included studies and the process of the review.

The authors' conclusions appear to follow from the results, but should be treated with caution due to the limitations stated previously, particularly because 10 of the 11 included studies did not have body weight reduction as a primary outcome measure.

**Implications of the review for practice and research**
The authors did not state any implications for further research and practice.

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**Other publications of related interest**

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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.