Authors' objectives
To evaluate the effectiveness of diets, drug treatment, behavioural interventions and other treatments for infantile colic.

Searching
MEDLINE was searched from 1966 to 1996, EMBASE from 1989 to 1995, as well as the Cochrane Controlled Trials Register. Search terms used were 'colic' and 'crying', both as subject headings and as free textwords (with an age restriction of <2 years). References lists were checked for missing publications.

Study selection
Study designs of evaluations included in the review
Trials with a concurrent control group were included.

Specific interventions included in the review
Dietary interventions (soy formula milk, hypoallergenic formula milk, low lactose milk, herbal teas, herbal mixture, fibre); behavioural interventions (increased carrying, reduction of stimulations plus permission to leave infant, specific management techniques); drug interventions (dicyclomine, simethicone). Trials of interventions lasting fewer than three days were excluded.

Participants included in the review
Children less than six months with infantile colic who cried excessively. Trials were excluded where children had a normal crying pattern and whose mothers had not complained of the crying.

Outcomes assessed in the review
The outcome was duration of crying or the presence of colic.

How were decisions on the relevance of primary studies made?
Two authors independently applied the exclusion criteria and reached a consensus.

Assessment of study quality
Quality assessment scale developed by Jadad et al (see Other Publications of Related Interest). Each trial was scored on adequacy of randomisation, double blinding, and completeness of follow-up. Quality of trials was graded from 0-5, based on the Jadad quality assessment scale. Trials scoring 0 or 1 were considered to be of too low quality to be included in the evidence. Two reviewers scored all the trials independently, but were not blind to information on the authors and journals. Consensus was reached in cases of disagreement.

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.

Methods of synthesis
How were the studies combined?
The effect sizes (and 95% confidence intervals) were calculated for each trial and pooled where the interventions were comparable. A random-effects model was used. Further details of how effect sizes were calculated for different study designs (eg cross-over) and data are available from the BMJ website.
How were differences between studies investigated?
A sensitivity analysis was performed, removing trials with quality scores of 0 or 1. A random-effects model was used because of the clinical heterogeneity.

Results of the review
Twenty-seven trials (n=1,257). Of the 18 trials with a score of 2 or more, 8 trials were of diet or herbal tea (n=288), 6 trials were of drug treatments (n=228), 3 trials were of behavioural therapy (n=146) and 1 used a combination of therapies (n=20).

Results from diet trials:
The pooled effect size of eliminating cows' milk was 0.22 (95% CI: 0.10 to 0.34); hypoallergenic formula milk effect size was 0.22 (95% CI: 0.09 to 0.35); soy formula milk effect size when the quality of the trial was not considered was 0.25 (95% CI: 0.00 to 0.50); soy formula milk effect size when calculations were made with methodologically-sound trials alone was 0.32 (95% CI: 0.17 to 0.81). Pooled results for the low lactose trials were not reported, but were not statistically significant. The trials reported no adverse events. Individual effect sizes for the non-pooled data were reported in a table. A trial of herbal mixture reported an effect size of 0.76 (95% CI: 0.62 to 0.89) (although quality rating was 0); herbal tea showed an effect size of 0.32 (95% CI: 0.10 to 0.54); fibre showed a non-significant effect size of 0.26 (95% CI -0.11 to 0.63).

Trials of drug treatment:
The pooled effect size of the anticholinergic drugs dicyclomine and dicycloverine was 0.46 (95% CI: 0.33 to 0.60). This result did not change when low quality trials were excluded from the calculations. Nine out of 177 infants (5%) showed adverse reactions; one of these infants received higher than the recommended dose, whereas the other infants were given normal doses.

The pooled effect size of simethicone treatment was not significant (no actual figures reported). This result did not change when only trials of sufficient quality were analysed.

Trials of behavioural interventions:
Effects sizes were not pooled for these trials. Effect size for one trial of increased carrying was 0.12 (95% CI: -0.03 to 0.27). Advice to reduce stimulation in combination with permission to leave the infant showed an effect size of 0.48 (95% CI: 0.23 to 0.74). A combination of general information and reassurance with vibration in a device simulating riding in a car together showed an effect size of -0.37 (95% CI: -0.69 to 0.05). Neither concomitant treatments nor side-effects were reported for these trials.

Trials comparing two active treatments:
No pooled effects sizes. One trial found that increasing parental responsiveness, as compared to eliminating cows' milk protein and substituting it with hypoallergenic formula milk, showed an effect size 0.30 (95% CI: 0.06 to 0.55).

Authors' conclusions
Infantile colic should preferably be treated by advising carers to reduce stimulation and with a one week trial of a hypoallergenic formula milk. The elimination of cows' milk protein, certain behavioural interventions and dicyclomine are effective treatments for infantile colic. However, anticholinergic drugs are not recommended because of their serious side effects.

CRD commentary
The objectives are clearly defined. The search strategy is adequate. There is a good assessment of validity of the included studies. The authors discuss the limitations of the studies included, such as the poor quality of the trials and their heterogeneity. They also recommend areas where further trials are needed.
There are, however, inconsistencies in the included trials. The authors state that trials would be excluded with quality scores of 0 or 1. Nine trials in the table of included trials had scores of 0 or 1. Two such trials were excluded from the evidence on this criterion, but three trials with a quality score of 1 were included in pooled analyses (a sensitivity analysis was, however, performed, excluding these trials from the pooled data). The other four trials were either not mentioned at all, or the results were written up descriptively in the results section. Furthermore, the pooled results trials of soy milk, including and excluding poor quality trials, have either been misinterpreted, or there is an error in the reporting. The authors report that when the poor quality trials are excluded from the analysis of trials of soy milk, the significance of the effect disappears. However, from the results presented, the effect size actually becomes more significant when poor quality trials are excluded (effect size for all trials was 0.25) (95% CI: 0.0 to 0.50); effect size excluding poor quality trials was 0.32 (95% CI: 0.17 to 0.81).

Although heterogeneity is explored with respect to the quality of trials, other sources of heterogeneity should have been addressed, such as the proportion of babies in the trials who were bottlefed/breastfed. It may not have been appropriate to combine trials where there were large differences with respect to this. The trials of soy formula milk, for example, are heterogeneous, even when the lower quality trial is removed. In one of these trials, the proportion of bottlefed babies was 100%, in the other 8%.

The conclusions of the review focused on the pooled results of two trials of hypoallergenic milk (one with only 17 babies who complete the trials, of a total of 132 babies), and did not adequately reflect the trials included in the review. The effectiveness of herbal tea, for example, was not thought to be established because only one trial was found, even though it was good quality trial (score of 5) with 68 babies. It is of concern that the authors chose to concentrate on the hypoallergenic milk intervention, when that was the only part of the review which was funded.

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Other publications of related interest


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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.