Dietary management of infantile colic: a systematic review
Iacovou M, Ralston RA, Muir J, Walker KZ, Truby H

CRD summary
The authors concluded that symptoms of colic may be reduced by a hypoallergenic maternal diet in breastfed infants and by using a hydrolysed protein formula or a soy-based formula in formula-fed infants. Limitations in the included studies and in the review methodology make the reliability of the authors' conclusions unclear.

Authors' objectives
To examine the effectiveness of dietary change for infantile colic in developed countries.

Searching
MEDLINE, CINAHL plus, AMED, Scopus, NUTRITIONnetBASE and The Cochrane Library were searched (1960 to June/July 2010). Search terms were indicated. Only published studies were considered for inclusion.

Study selection
Studies were included if they were primary studies – randomised controlled trials (RCTs), cohort studies, case-control studies or cross-sectional studies – of any dietary intervention for infant colic. Infants were included if they were aged six months or less and healthy and typically developing. Any feeding pattern (breastfed, formula-fed or solid food) was permitted. Mothers had to be healthy and aged 18 to 45 years. Studies had to be conducted in developed countries. Studies were excluded if infants or mothers were on medication and if the study focused on taste only. Where a study also included a non-dietary intervention, only the dietary intervention was used in the review.

Three-quarters of the included studies were RCTs. Interventions included changes in maternal diet of breastfed infants, use of hydrolysed formulae, soy-based formulae or fibre-enriched formulae and change of carbohydrate. Follow-up periods ranged between 1.5 hours and 30 days. The main outcome reported was time spent crying.

The authors did not state how many reviewers selected studies for inclusion.

Assessment of study quality
Study quality was assessed using a quality checklist of the American Dietetic Association (no further details reported). Quality was rated as negative, neutral or positive.

The authors did not state how many reviewers assessed quality.

Data extraction
Data were extracted and studies were grouped according to intervention type. One author analysed each study but a second opinion was sought in case of doubt.

Methods of synthesis
Studies were summarised narratively in text and tables and grouped according to intervention (change of maternal diet, hydrolysed formulae, soy-based formula and fibre enriched).

Results of the review
Twenty-two primary studies (approximately 1,400 participants, range six to 272) were included in the review: 17 RCTs, three non-randomised trials, one case-control study and one cross-sectional study. Six studies examined change in maternal diet in breastfed infants (533 participants), 13 studies examined use of partially, extensively or completely hydrolysed formulae (517 participants), four studies examined the use of soy-based formulae (281 participants), one study examined the effect of a fibre-enriched formula (27 participants) and three studies examined the effects of carbohydrate alteration (40 participants). Fifteen studies were rated positive quality, three were rated neutral and four rated negative quality.

Three of the six studies that examined changes in maternal diet of breastfed infants found some beneficial effects of...
the mother changing to a hypoallergenic diet (two studies did not separate results from breastfed infants and results from infants fed hypoallergenic formula). Two studies that examined only elimination of cow's milk or dairy products, fish and eggs from the diet found no beneficial effects on colic; a cross-sectional study reported increased colic with consumption of cruciferous vegetables, cow's milk and onions, and no effect of garlic or chocolate.

The results from the 13 studies that examined partially, extensively or completely hydrolysed infant formula strongly suggested that these preparations can reduce symptoms of colic. All of the studies of partially, extensively or completely hydrolysed infant formula showed improvements in the intervention groups (such as reduced crying time, reduced colic symptoms).

All four studies of use of soy-based formula showed some improvement in the intervention groups. In one of the studies this was similar to the effect of partially hydrolysed formula. There were fewer symptoms of colic in studies of soy-based formula compared to cow's milk based formula; in one higher quality RCT the effect was relatively small.

One study compared fibre-enriched infant soy-based formula with soy-based formula only and found no significant difference on crying and fussing time.

One of the three studies of carbohydrate alteration did not report on infants with colic and another found that juices with poorly absorbed carbohydrates (apple) induced more crying in infants with colic than juices with readily absorbed carbohydrates (grape). There was no difference in infants without colic. In the third study there was no significant effect of pooled breast milk or cow's milk with hydrolysed lactose on colic duration compared to preparations without hydrolysed lactose.

**Authors' conclusions**
The evidence suggested that in breastfed infants a hypoallergenic maternal diet may be beneficial in reducing symptoms of colic. In formula-fed infants, symptoms of colic may improve after changing from a standard cow's milk formula to either a hydrolysed protein formula or a soy-based formula. There was no effect of fibre-enriched formulae. Removing poorly absorbed carbohydrates from the infant's diet may be beneficial but further studies were needed.

**CRD commentary**
The review question and inclusion criteria were clear. Various relevant databases were searched but no supplementary searches were mentioned so some less easily identifiable studies may have been overlooked (including unpublished studies). Review processes (selection, quality assessment and data extraction) were not clearly reported and the use of a single reviewer means error or bias may have influenced the review.

The description of the quality of the included studies was limited. Seventeen of 22 studies were RCTs and 15 were given a "positive" quality rating but quality limitations were evident in the included studies. Outcomes were often subjective and generally poorly defined. Many of the studies had small sample sizes (more than half had a sample size of 20 or less). There was a large variety in interventions and comparators. Because of this, data were summarised narratively and were analysed using a vote-counting approach.

Limitations in the included studies and in the review methodology make the reliability of the authors' conclusions unclear.

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

**Practice:** The authors stated that expert nutritional guidance should be sought when changing the maternal diet of breastfed infants. Mothers should be reassured that infantile colic is a self-limiting condition.

**Research:** The authors stated a need for studies to compare the effects of formulae with different degrees of hydrolysis on infant colic. Effects of dietary change should be compared with use of dietary extracts or supplements and with programmes for behavioural change or acupuncture.

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