Probiotics and prebiotics in atopic dermatitis: review of the theoretical background and clinical evidence

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CRD summary
This review examined the evidence-based for probiotics, prebiotics and synbiotics for prevention and treatment of atopic dermatitis in children. The authors concluded that there was insufficient evidence to support use of these interventions in clinical practice. Methodological limitations in the included studies and the review process made the overall reliability of the authors’ conclusions unclear.

Authors' objectives
To examine the clinical evidence for using probiotics, prebiotics and synbiotics in the prevention and treatment of atopic dermatitis in children.

Searching
PubMed, EMBASE and The Cochrane Library were searched from inception to February 2008. Search terms were reported. Reference lists of retrieved papers were reviewed.

Study selection
Randomised controlled trials (RCTs) that examined the effects of probiotics, prebiotics or synbiotics for the prevention or treatment of atopic dermatitis in children were eligible for inclusion.

Strains and dosing schedules of probiotics and synbiotics varied widely. Where reported, duration of preventive intervention ranged from two weeks to 36 weeks for mothers and six months to two years for their infants. Length of follow-up was six months to seven years. For curative treatment studies, duration of treatment ranged from four weeks to six months. Age at inclusion in the treatment studies ranged from 2.5 months to 5.9 years.

The authors did not state how many reviewers selected the studies.

Assessment of study quality
Quality of the included studies was assessed with Dutch Institute for Health Care Improvement (CBO) criteria, which graded studies as: A2 for good-quality RCTs and B for poorer quality RCTs. The authors did not state how each quality component was assessed.

The authors did not state how many reviewers assessed quality of the included studies.

Data extraction
The effect of intervention on atopic dermatitis incidence was compared between intervention and control groups in a qualitative synthesis and with the Scoring Atopic Dermatitis (SCORAD) index for treatment studies. Odds ratio (OR) and hazards ratio (HR), with confidence intervals (CI), and incidence rate were calculated from change in atopic dermatitis incidence between pre- and post-intervention periods.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
The studies were combined in a narrative synthesis grouped by treatment type (prebiotics, probiotics, or synbiotics) and objective (prevention or treatment).
Results of the review
Eighteen studies were included: seven prevention (n=2,197) and 11 treatment (n=712) studies that met the inclusion criteria. Seven RCTs assessed prevention and 11 RCTs assessed treatment of atopic dermatitis, although the authors stated that 12 studies assessed treatment. Six of the seven studies that assessed prevention were level A2 and one was level B. Seven of the 11 treatment studies were level A2 evidence.

Results on use of probiotics in prevention of atopic dermatitis were mixed. One study reported a 50% reduction in the incidence of atopic dermatitis compared to placebo and another study showed no reduction. One study showed that only one strain of probiotics reduced incidence of atopic dermatitis.

Treatment of atopic dermatitis with probiotics showed conflicting results: four studies demonstrated reduction of SCORAD score and three studies showed no effect on atopic dermatitis, but did show a significantly modest SCORAD score with IgE-associated atopic dermatitis.

The one double-blind RCT conducted so far showed that incidence of atopic dermatitis was significantly lower in prebiotics group than the placebo group (9.8% versus 23.1%). A large proportion (>20%) of the infants were lost to follow-up during the intervention period. Four studies reported no effect on the severity of atopic dermatitis in any group.

The one study that investigated the use of synbiotics for the treatment of atopic dermatitis showed a significant improvement, but synbiotics did not appear to be superior to prebiotics alone.

Two studies that assessed the effect of probiotics on food allergies as a secondary outcome did not find any difference in incidence.

Authors’ conclusions
There was insufficient evidence in support of the use of probiotics, prebiotics or synbiotics for the prevention or treatment of atopic dermatitis in children in clinical practice.

CRD commentary
This review addressed a clear research question. The search included appropriate electronic databases. No apparent attempts were made to retrieve unpublished studies, so some relevant studies might not have been included. No information about data extraction was provided and errors could not be ruled out. The lack of multiple reviewers raised concerns about the potential for errors and bias. Risk of bias in the included studies could not be ruled out. Although potential sources of heterogeneity were explored qualitatively, this could not be addressed in the review. Not all of the included evidence was referred to in the synthesis.

Methodological limitations in the included studies and the review process made the extent to which the authors’ conclusions are reliable unclear.

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

Research: The authors stated that a large well-designed placebo controlled randomised trial with different probiotic strains was needed to draw definitive conclusions about prebiotics in the treatment and prevention of atopic dermatitis.

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