Peninsula Cerebra Research Unit
PenCRU Childhood Disability Research

What's the Evidence?

Complementary and alternative treatments for ADHD: Elimination diets for ADHD

Key findings

- A recent systematic review combined the best available evidence and found that, in the general population of children with ADHD, there is no evidence that elimination diets have a significant beneficial effect.
- However, there may be some children who are sensitive to artificial food additives and may respond to avoiding these in their diet.
- Restricting the diet of a child will be time consuming and potentially disruptive to the family, and could also be a barrier to the child being included socially in various settings.
- Therefore, there is insufficient evidence for the benefit of these diets to recommend them for all children with ADHD.

PLEASE NOTE: This summary was produced more than 4 years ago. Information provided may be out of date. If you think it would be helpful to update this summary please contact us at pencru@exeter.ac.uk

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What were we asked?

A survey of parents of children with Attention Deficit Hyperactivity Disorder (ADHD) indicated that they were interested in whether eliminating artificial food colourings and additives from their child's diet might affect symptoms of ADHD.

What did we do?

In 2012 we searched a range of academic databases including The Cochrane Library, Pubmed, Embase, Psychinfo and consulted the National Institute for Health and Clinical Excellence guidance for evidence on this topic. This search was updated in April 2013.

What did we find?

What are artificial food colours and additive elimination/restriction diets?

It has been suggested that artificial food additives such as colourings, flavourings and preservatives, may increase symptoms of hyperactivity in children with ADHD, and that eliminating these additives from the

diets of children with ADHD may reduce symptoms.

There has been particular interest in avoiding food colourings such as tartrazine and quinoline. A list of current EU approved additives and their E numbers can be found on the Food Standards Agency website.[1]

- A high quality systematic review published in 2013 summarised evidence from 15 randomised controlled trials that had studied the effects of restricted elimination diets.[2]
- Trials that had studied children aged 3-18, either with a diagnosis of ADHD or meeting accepted criteria for an ADHD diagnosis, were included in the review.
- Studies compared a non-pharmacological treatment for ADHD to a control group receiving treatment as usual or a placebo.
- Outcomes measured were ADHD symptom severity before and after treatment.

This review involved a comprehensive search for studies in a range of academic databases, published at any time. The review summarised the evidence for several non-pharmacological therapies for ADHD including elimination diets.

Artificial food colour exclusion

Seven of the studies included in the systematic review focused on artificial food colour exclusion.[3-9]

The best quality results from these studies were combined in a meta-analysis. This is a way of bringing together the results of several smaller studies into a single result. This analysis involved results from 294 children from the eight studies.

The initial analysis, including all results, suggested that food colour restriction diets have a significant beneficial effect on ADHD symptoms in children. These results were still significantly significant when only results where the assessor did not know what treatment the child had been allocated were included. This is known as a 'blinded' assessment; the results from blinded assessments are known to be less susceptible to bias, because an assessor may be rate the effects of the intervention differently if they are aware of the child's treatment.

Another analysis only included the four trials where less than 30% of participants were taking pharmacological medications for ADHD. This reduces the chance of the results being caused or affected by the medication. For these four trials, the effects of food colour restriction were reduced to non-significant levels.

General restriction diets

The results from seven further trials that had investigated the effects of restricted elimination diets were also combined in a meta-analysis.[10-16]

These were studies of eliminating specific additives or preservatives suggested to be associated with ADHD symptoms, and also general elimination diets, such as oligoantigenic diets. Results from 407 children were included in this analysis.

The most robust meta-analysis found that these elimination diets had no significant beneficial treatment effect on ADHD symptoms.

What do we think?

The question of whether elimination diets are effective at reducing symptoms of ADHD in children is the subject of longstanding debate. The latest systematic review appears to be comprehensive in including the best available and most relevant evidence.

There may be a group of children who are sensitive to artificial food additives and may respond to avoiding these in their diet. However, the general population of children with ADHD do not show positive therapeutic benefits from following these diets. There remains a need for further high-quality studies on larger and unselected samples of children with ADHD before we would be able to recommend this to parents and carers of children with ADHD. It is essential that these studies use blinded assessments, to ensure that any positive findings are due to the treatment alone.

Restricting the diet of a child will be time consuming and potentially disruptive to the family, and could also be a barrier to the child being included socially in various settings.

Currently, NICE guidance does not recommend the elimination of artificial food colourings and additives from the diet as a general treatment for children with ADHD. NICE does recommend that if there is a clear link between specific foods and drinks and symptoms, a referral to a dietician for further management in conjunction with the paediatrician or child psychiatrist would be appropriate.

We would like to hear your feedback on this summary – please email us at pencru@exeter.ac.uk if you have any comments or questions.

References

1. Food Standards Agency. Current EU approved additives and their E Numbers. 2012; Available from: http://www.food.gov.uk/policy-advice/additivesbranch/enumberlist#.UVrmvTeyHex.

2. Sonuga-Barke EJ, Brandeis D, Cortese S, Daley D, Ferrin M, Holtmann M, et al. Nonpharmacological Interventions for ADHD: Systematic Review and Meta-Analyses of Randomized Controlled Trials of Dietary and Psychological Treatments. The American journal of psychiatry. 2013 Mar 1;170(3):275-89.

3. Goyette GH, Connors CK, Petti TA, Curtis LE. Effects of artificial colors on hyperkinetic children: a double-blind challenge study [proceedings]. Psychopharmacology bulletin. 1978 Apr;14(2):39-40.

4. Harley JP, Matthews CG, Eichman P. Synthetic food colors and hyperactivity in children: a double-blind challenge experiment. Pediatrics. 1978 Dec;62(6):975-83.

5. Harley JP, Ray RS, Tomasi L, Eichman PL, Matthews CG, Chun R, et al. Hyperkinesis and food additives: testing the Feingold hypothesis. Pediatrics. 1978 Jun;61(6):818-28.

6. Williams JI, Cram DM, Tausig FT, Webster E. Relative effects of drugs and diet on hyperactive behaviors: an experimental study. Pediatrics. 1978 Jun;61(6):811-7.

7. Conners CK, Goyette CH, Southwick DA, Lees JM, Andrulonis PA. Food additives and hyperkinesis: a controlled double-blind experiment. Pediatrics. 1976 Aug;58(2):154-66.

8. Levy F, Hobbes G. Hyperkinesis and diet: a replication study. The American journal of psychiatry. 1978 Dec;135(12):1559-60.

9. Adams W. Lack of behavioral effects from Feingold diet violations. Perceptual and motor skills. 1981 Feb;52(1):307-13.

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10. Pelsser LM, Frankena K, Toorman J, Savelkoul HF, Dubois AE, Pereira RR, et al. Effects of a restricted elimination diet on the behaviour of children with attention-deficit hyperactivity disorder (INCA study): a randomised controlled trial. Lancet. 2011 Feb 5;377(9764):494-503.

11. Pelsser LM, Frankena K, Toorman J, Savelkoul HF, Pereira RR, Buitelaar JK. A randomised controlled trial into the effects of food on ADHD. European child & adolescent psychiatry. 2009 Jan;18(1):12-9.

12. Kaplan BJ, McNicol J, Conte RA, Moghadam HK. Dietary replacement in preschool-aged hyperactive boys. . Pediatrics. 1989;83:7-17.

13. Carter CM, Urbanowicz M, Hemsley R, Mantilla L, Strobel S, Graham PJ, et al. Effects of a few food diet in attention deficit disorder. Archives of disease in childhood. 1993 Nov;69(5):564-8.

14. Egger J, Carter CM, Graham PJ, Gumley D, Soothill JF. Controlled trial of oligoantigenic treatment in the hyperkinetic syndrome. Lancet. 1985 Mar 9;1(8428):540-5.

15. Schmidt MH, Mocks P, Lay B, Eisert HG, Fojkar R, Fritz-Sigmund D, et al. Does oligoantigenic diet influence hyperactive/conduct-disordered children--a controlled trial. European child & adolescent psychiatry. 1997 Jun;6(2):88-95.

16. Boris M, Mandel FS. Foods and additives are common causes of attention deficit hyperactive disorder in children. Ann Allergy. 1994;72:462-8.

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