ADHD and Food Additives Revisited

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DEVELOPMENTAL/BEHAVIORAL PEDIATRICS

ADHD and Food Additives Revisited

Source: *McCann D, Barrett A, Cooper A, et al. Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomised, double-blinded, placebo-controlled trial. Lancet. 2007:370(9598):1560-1567; doi:10.1016/S0140-6736(07)61306-3*

PICO

Question: Does intake of food coloring and food preservatives affect hyperactive behavior of three-year-olds and eight- to nine-year-olds as rated by parents, teachers, and independent observers?

Question Type: Harm

Study Design: Within-subject crossover placebo-controlled intervention

Researchers from Southampton, UK, conducted a randomized controlled trial to examine the effects of food additives on behavior in children.

Drinks containing either artificial food coloring and preservative (sodium benzoate) or placebo were given to groups of three-year-olds and eight- and nine-year-olds after six weeks of a benzoate-free and specific food coloring–free diet. Two mixes were created, one similar to that used in a previous study by this same group of researchers,[1] and another approximating the average daily consumption of food additives in UK children of these age groups. Using a within-subject crossover design, investigators assessed the effects of each of the two mixes and placebo based on teacher, parent, and independent observer ratings of inattention, hyperactivity, and impulsivity behaviors.

The study group included 153 three-year-old children (mean age 43.5 months, 74 boys) registered for nurseries and preschool groups and 144 eight- or nine-year-old children (mean age 106.4 months, 75 boys) attending Southampton schools. A total of 73 three-year-olds and 91 eight- and nine-year-olds consumed ≥85% of the study drinks and had no missing data. The children came from the full range of socioeconomic backgrounds. To further check that the study sample was representative, teachers were asked to complete a hyperactivity questionnaire on all three-, eight-, and nine-year-old children. The proportion of children in each of five quintile ranges on the teachers' questionnaire was not significantly different for the sample and the total population.

Compared to when they were consuming the placebo drinks, three-year-olds had significantly higher hyperactivity scores when consuming a daily drink containing 20 mg artificial food coloring and sodium benzoate preservative (comparable to the amount of food coloring in two 56-gram bags of sweets), and eight- and nine-year-olds were more hyperactive when consuming drinks containing food coloring and preservative comparable to four bags of sweets. However, there was no effect on three-year-olds when exposed to the larger amount of food coloring (attributed to greater variability in response to active challenges than placebo). No distinction could be made between the effects of food coloring versus preservative on child behavior, and the reason for the age-related difference in effects of the two mixtures used remains unclear. However, the authors conclude that the results of the study suggest that food additives and/or sodium benzoate increase hyperactive behavior in children.

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Despite increasing data supporting the efficacy of stimulants in preschoolers with attention deficit hyperactivity disorder (ADHD),[2] parents and providers understandably seek safe and effective interventions that require no prescription. A recent meta-analysis of 15 trials concludes that there is "accumulating evidence that neurobehavioral toxicity may characterize a variety of widely distributed chemicals."[3] Some children may be more sensitive to the effects of these chemicals, and the authors suggest there is a need to better identify responders. In real life, practitioners faced with hyperactive preschoolers have a reasonable option to offer parents. For the child without a medical, emotional, or environmental etiology of ADHD behaviors, a trial of a preservative-free, food coloring–free diet is a reasonable intervention.[4]

Editors' Note

Although quite complicated, this was a carefully conducted study in which the investigators went to great lengths to eliminate bias and to rigorously measure outcomes. The results are hard to follow and somewhat inconsistent. For many of the assessments there were small but statistically significant differences of measured behaviors in children who consumed the food additives compared with those who did not. In each case increased hyperactive behaviors were associated with consuming the additives. For those comparisons in which no statistically significant differences were found, there was a trend for more hyperactive behaviors associated with the food additive drink in virtually every assessment. Thus, the overall findings of the study are clear and require that even we skeptics, who have long doubted parental claims of the effects of various foods on the behavior of their children, admit we might have been wrong.

References

1. Bateman B, et al. *Arch Dis Child.* 2004;89:506-511.
2. Abikoff HB, et al. *J Child Adolesc Psychopharmacol.* 2007;17:581-592.
3. Schab DW, et al. *J Dev Behav Pediatr.* 2004;25:423-434.
4. Eigenmann PA, et al. *Lancet.* 2007; 370:1524-1525.

NEUROLOGY

Long-term Outcome of Neonatal Seizures

Source: *Ronen GM, Buckley D, Penney S, et al. Long-term prognosis in children with neonatal seizures. Neurology. 2007;69(19):1816-1822; doi: 10.1212/01.wnl.0000279335.85797.2c*

PICO

Question: Among infants with neonatal seizures, what are the most likely long-term outcomes?

Question type: Prognosis

Study design: Cohort

In a population-based cohort from Newfoundland, researchers from Ontario and Newfoundland sought to determine the prognostic markers and functional status of school-aged youth who experienced clinical neonatal seizures (CLNESZ).

All children born in Newfoundland from 1990 through 1994 were prospectively followed. In 2004-2005 data on mortality, physical disability, cognitive impairment, learning disability during school age, other neurologic impairments, and post-neonatal epilepsy were collected. Normal outcome was defined as the absence of intellectual and physical impairment.

Of the 34,615 infants in the study, follow-up data were available on 82 of 90 diagnosed with CLNESZ. The authors assumed that three infants with a benign neonatal course not available for

