Nutritional Therapy for ADHD
How to improve your child’s behaviour, learning and health
Deborah Colson MSc DipION
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ADHD Richmond

Deborah Colson MSc DipION MBANT CNHC
Registered Nutritional Therapist

- Specialist in children’s nutrition and mental health
- Author of Optimum Nutrition for Your Child, and Optimum Nutrition for your Child’s Mind and Alzheimer’s Prevention Plan
- MSc Nutritional Therapy (University of Westminster, 2014)
- AFMCP-UK – London (Institute for Functional Medicine, 2011)
- Institute for Optimum Nutrition (DipION, 2002)
- Professional Association: British Association for Applied Nutrition and Nutritional Therapy (BANT)
- Regulator: Complementary and Natural Healthcare Council (CNHC) - Professional Standards Authority Accredited Register

Clinical Practice

- Brain Bio Centre
  - Clinic for nutritional treatment of mental health and neurological disorders (since 2003)
  - Part of charity Food for the Brain whose aim is to raise awareness of link between nutrition and mental health
- Learning Assessment and Neurocare Centre
  - Multi-disciplinary clinic specialising in assessment and management of individuals with ADHD, ASD and other complex neurodevelopmental conditions
- The Insight Network
  - Psychiatry and psychological therapies for a range of issues including stress, depression, anxiety
- Re:Cognition Health
  - Multi-disciplinary cognitive health clinic

What is Nutritional Therapy?
“the application of nutrition and health science to enable individuals to maximise their health potential”

- Full case history
- Practical dietary, lifestyle and supplement advice, tailored to the individual
- Biochemical / nutritional tests often utilised
- Optimise biochemistry
- Address risk factors
- Manage drug-nutrient interactions
- Informed by evidence base
- Favourable risk:benefit ratio
- ‘Wholistic’ – benefits are broad

Nutrition and lifestyle-related factors

- blood glucose control
- essential fatty acids
- minerals
  - Mg, Se, Zn, Cr, Mn, I, Cu, Ca
- vitamins
  - D, Bs, C, E, A, K
- amino acids and neurotransmitters
- phytonutrients
- dietary patterns
  - (eg Mediterranean diet)
  - microbiome (gut flora)
- homocysteine
- drug-nutrient interactions
- food intolerances
- oxidative stress
- environmental toxins
- stress
- sleep
- exercise
- and more.....

WELL-NOURISHED CHILDREN DO BETTER
ADHD

....complex, multi-factorial disorder caused by the confluence of many different types of risk factors (i.e., genetic, biological, environmental, psychosocial), with every type having a small effect on the increasing vulnerability to the disorder through their additive and interactive effects.

If an individual's cumulative vulnerability exceeds a threshold, he or she will manifest the signs and symptoms of ADHD. According to this multi-factorial model of ADHD, no one causal factor is necessary or sufficient to initiate the disorder and all these factors are interchangeable (i.e. only the total number is important).”


Ritalin vs supplements

• 20 ADHD children
• Ritalin vs dietary supplements
  • vitamins, minerals, phytonutrients, amino acids, essential fatty acids, phospholipids, and probiotics
• Significant improvements in both groups
• Findings “suggest food supplement treatment of ADHD may be of equal efficacy to Ritalin treatment”


Vitamins and minerals for children with ADHD

• 14 participants (8-12 years of age) with ADHD
• 8 weeks on 36 micronutrients, 4 weeks off, 8 weeks on, 4 weeks off
• Primary outcomes: Conners’ Parent Rating Scale, Clinical Global Impressions Scale (CGI), Strengths and Difficulties Questionnaire - Parent version (SDQ). Secondary outcomes were mood and global functioning.
• Results: statistically significant reduction in ADHD symptoms, improved mood, and improved overall functioning during intervention phases, and deterioration in ADHD symptoms, mood, and overall functioning during the withdrawal phases.
• 71% showed at least a 30% decrease in ADHD symptoms, and 79% were identified as “much improved” or “very much improved” based on the clinician-rated CGI
• SDQ showed that these benefits occurred across other areas of functioning including emotional symptoms, conduct problems, and prosocial behaviours
• The children’s self-reports confirmed the improvements.


Nutrients and Adult ADHD

• RCT, 8 wks, 80 adults w/ADHD, micronutrients (n=42) or placebo (n=38)
• Active group
  • greater improvement on CGI-I scale: a 0.6 point greater decrease vs placebo in ADHD symptom score, and 0.7 point greater decrease for global functioning
  • significantly greater improvement on CAARS scales on the self- and observer-rated assessments (respectively, 6.7 and 5.1 points greater decrease vs placebo)
  • significantly greater improvement in general functioning on GAF scale
• There were no group differences in adverse events


Iron and ADHD

• 23 non-anemic ADHD children (aged 5-8 years) with serum ferritin levels <30 ng/mL
• Either oral iron (ferrous sulfate, 80 mg/day, n = 18) or placebo (n = 5) for 12 weeks
• Progressive significant decrease in ADHD Rating Scale after 12 weeks on iron (P < 0.008), but not on placebo (P = 0.308)
• Clinical Global impression-Severity significantly decreased (P < 0.01) with iron. No change on placebo
• “Iron supplementation (80 mg/day) appeared to improve ADHD symptoms in children with low serum ferritin levels...... Iron therapy was well tolerated and effectiveness is comparable to stimulants”


35% reduction in aggression in young offenders

• RCT, young offenders, maximum security prison
• Multi-nutrient containing RDA levels of vitamins, minerals and EFAs, or placebo
• 35 per cent decrease in acts of aggression after only two weeks!


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Relationship between diet and mental health in children and adolescents: a systematic review

- Systematically reviewed 12 epidemiological studies to determine whether an association exists between diet quality and patterns and mental health in children and adolescents;
- 9 explored the relationship using diet as the exposure and 3 used mental health as the exposure.
- Evidence of a significant, cross-sectional relationship between unhealthy dietary patterns and poorer mental health in children and adolescents.
- Observed a consistent trend for the relationship between good-quality diet and better mental health and some evidence for the reverse.


Iron, magnesium, vitamin D, and zinc deficiencies in ADHD children

- Research exists showing that patients with ADHD may have reduced levels of vitamin D, zinc, ferritin, and magnesium.
- These nutrients have important roles in neurologic function, including involvement in neurotransmitter synthesis.


Catecholamine synthesis

Omega-3, especially oily fish/fish oil

- Good evidence, likely to be lacking
- Key role in neurotransmitter reception
- Sources
  - Oily fish, linseeds, walnuts, their oils, green veg

Omega-3 and childhood depression

- Pilot study
- 28 children aged 6-12, major depression
- Assessed using Children’s Depression Rating Scale (CDRS), Children’s Depression Inventory (CDI), and Clinical Global Impression (CGI)
- Children were given either omega-3 fats or placebo for 16 weeks
- Highly significant benefits of omega-3 versus placebo, on symptoms measured by the rating scales


Omega-3 Fatty Acid Supplementation for the Treatment of Children With Attention-Deficit/Hyperactivity Disorder Symptomatology: Systematic Review and Meta-Analysis

- Omega-3 fatty acid supplementation modestly effective in the treatment of ADHD.
- The relative efficacy of omega-3 fatty acid supplementation was modest compared with currently available pharmacotherapies for ADHD such as psychostimulants, atomoxetine, or α2 agonists.
- However, given its relatively benign side-effect profile and evidence of modest efficacy, it may be reasonable to use omega-3 fatty supplementation to augment traditional pharmacologic interventions or for families who decline other psychopharmacologic options.

Superfoods?

- Berries (flavonoids, anthocyanins)
- Brassicas (sulphoraphane)
- Turmeric (curcumin)
- Green tea (catechins)
- Grapes (resveratrol)
- Cocoa solids (flavonols)

VITAMIN D
THE ESSENTIAL BRAIN NUTRIENT

Vitamin D and ADHD

- Case-control study, 1,331 children and adolescents with ADHD, 1,331 controls, aged 5-18 years
- Significant association between ADHD and vitamin D deficiency
  (OR 1.54; 95% CI 1.32-1.81; P < 0.001)
- Mean values of vitamin D (ng/mL) were significantly lower in ADHD children (16.6 ± 7.8) vs controls (23.5 ± 9.0) (P < 0.001)

Kamal M et al (2014) Is high prevalence of vitamin D deficiency a correlate for attention deficit hyperactivity disorder? Atten Defic Hyperact Disord. 6(2):73-8

Key sleep nutrient: Magnesium

- ‘Nature’s tranquiliser’
- Commonly deficient
- Deficiency symptoms: sleep problems, anxiety, constipation, hyperactivity, depression, cramps
- Food sources: green leafy vegetables, seeds
- Difficult to get enough through diet alone

Key brain nutrient: Zinc

- Essential for growth and immunity
- Difficult to get enough through diet alone
- Diet surveys indicate children take in too little
- Blood tests reveal deficiencies are common
- Sources: Oysters, nuts, seeds, lamb, sardines, eggs, pulses

ADHD and sugar-sweetened beverages (SSB)

- 173 ADHD children and 59 non-ADHD controls (age 4 to 15)
- SSB consumption, socio-demographic and lifestyle characteristics of the children, as well as of their mothers' characteristics during pregnancy, were collected using a questionnaire.
- There was a dose-response relationship between SSB consumption and ADHD.
- Children who consumed SSBs at moderate levels and high levels had 1.36 and 3.69 odds, respectively, of having ADHD, compared with those who did not consume SSBs ($p$ for trend < 0.05).

ADHD and sugar

“We postulate that sugar acutely increases dopamine, which, over time, leads to a reduced number of D2 receptors and possibly a reduction in extracellular dopamine itself, leading to desensitization of this dopamine signaling axis.

These effects would not be due to the acute effects of sugar, but rather would occur over weeks to months with chronically elevated and intermittent sugar ingestion.”


Sugar

- Sugar is the pure form of carbohydrate
- It is found in many ‘healthy’ and low fat foods
  - Eg fruit yoghurts, breakfast cereals, juices and smoothies
- Refined carbohydrates such as white bread/pasta/rice have a marked sugar effect

“Who wants jam on their toast?”

“Jam! Are you serious?”

“What kind of father gives his kids jam?”

“Why don’t you just put drugs on our toast?!”

“Yeah, why don’t you just give us drugs?!”
Taking the sting out of sugar

- **Protein, fat** and **fibre** slow stomach emptying, thereby slowing the entry of glucose into the bloodstream
- So, adding protein and fibre to food is helpful
- **But, fat is unhealthy, right?**

The ecosystem in the gut

- The human gut contains $10^{14} – 10^{15}$ bacteria
  - 10–100 times more bacteria in the gut than cells in the human body, 1000 distinct species
  - This is a dynamic ecosystem, influenced by genetics, diet, metabolism, age, geography, antibiotic treatment, and stress
- Gut ecology – increased diversity is key to healthy ecological systems including gut
- Increasing evidence of the role of our gut flora in every aspect of our health including mental health

Baby colonised by:

- Placenta, birth canal, breast milk
- The outdoors
  - Babies sticking stuff in their mouths is an evolutionary action to colonise gut and increase diversity
- Fermented foods

Colonisation reduced by:

- caesarean births, maternal antibiotics, formula feeding, refrigeration/chemical preservation (less fermented food), outdoors less, over-sanitised environment

Looking after the gut ecosystem

- Fibrous foods, well-chewed, eg vegetables, pulses
- Avoid excess sugary or processed food
- Eat more fermented foods:
  - Live cultured pickles, sauerkraut, vegetables and kimchi - unpasteurised
  - Unpasteurised miso (which has not been heated) – look for a jar/tub of paste
  - Tempeh, made from fermented soya
  - Fermented drinks and tea such as kombucha
  - Yogurt and kefir made with live cultures
- Avoid unnecessary antibiotics (follow with probiotics)
FOOD SENSITIVITIES

Symptoms of food sensitivities

- Irritability
- Aggressive outbursts
- Nervousness
- Depression
- Confusion
- Forgetfulness
- Poor concentration
- Dark eye circles
- Dizziness
- Anxiety
- Fatigue
- Insomnia
- Headaches
- Ear, nose and throat problems

Symptoms of food sensitivities

- Strong attraction to a particular food
- Digestive problems
- Diarrhoea
- Constipation
- Bloating
- Flatulence
- ‘Red ears’ after eating
- Blocked/runny nose
- Frequent colds
- Asthma
- Muscle aches
- Hay fever
- Migraines
- Eczema
- Rashes

Gluten syndrome: a neurological disease?

Gluten can cause neurological harm through a combination of cross reacting antibodies, immune complex disease and direct toxicity.

Effects include: dysregulation of the autonomic nervous system, cerebella ataxia, hypotonia, developmental delay, learning disorders and ADHD, depression, migraine, and headache.


Usual suspects for trial exclusion

- Gluten
  - Gluten: wheat, rye, barley, oats (if contaminated)
  - Gluten-free products widely available but often expensive and poor quality food
- Dairy
  - Casein: all forms of dairy products from any animal
  - Alternative ‘white liquids’ available to replace milk
- Soya
- Yeast
- Alternatives: sourdough products, baking soda
- Eggs??

Key takeaways

- ADHD is a complex neurobiological disorder, for which there is no simple solution
  - It is not all about dopamine and noradrenaline!
- Nutritional therapy can have an enormous impact on your child’s mental and physical health, enabling them to be all they can be
- Side effects of nutritional therapy include:
  - better health!
What if nutrients could treat mental illness?

- Slow acceptance of nutritional interventions is not unusual.
- Captain James Lancaster carried out a cohort study in 1601, which showed that lemon juice prevented scurvy.
  - In a voyage from England to India, sailors on one ship took daily lemon juice and those on the other three did not. Halfway through the voyage, none of those on the ship taking lemon juice had died, whereas 40% of the sailors on the other three ships had perished.
- The experiment was repeated 146 years later in 1747 by James Lind, a physician. Despite the evidence, practices did not change.
- It took another 48 years for the British Navy to order citrus fruits be provided on navy ships; however, universal preventive policy was not enacted for another 70 years when the British Board of Trade adopted the innovation.
- 264 years passed from the first trial to the change in national policy!


Action points

- Read my book
- Individual consultations at the Brain Bio Centre (and by Skype)
  - Call 020 8332 9600 or email info@brainbiocentre.com
- Talks to teachers, parents, caterers, students
- Campaigns in schools and extra-curricular groups

Caudwell Children

- Fabulous charity provides financial assistance to access treatment at the Brain Bio Centre
  - caudwellchildren.com

Thank you for listening!

Deborah Colson MSc

- Deborah@ThinkingNutrition.co.uk
- ThinkingNutrition.co.uk
- @thinkinutrition
- Thinking Nutrition
- deborahcolson