The International Journal of Indian Psychology
ISSN 2348-5396 (e) | ISSN: 2349-3429 (p)
Volume 6, Issue 2, DIP: 18.01.030/20180602
DOI: 10.25215/0602.030
http://www.ijip.in | April - June, 2018

Research Paper

Managing ADHD with Nutrition – A Case Study Report

Vandana Vijayan[1]*, Dr. K.Govind[2], Dr. Ramaa Raju[3]

ABSTRACT

According to the WHO Mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community. One of the most obvious, yet under-recognised environmental factors in the development of major trends in mental health is the role of nutrition. The study is a qualitative analysis on one subject. The objective is to investigate the role of nutrition in the effective management of Attention-deficit/hyperactivity disorder (ADHD), as balanced nutrition is very important during childhood which is a period of vigorous growth, increased activity, and development of body functions and social cognitive abilities. The treatment implications of research into nutrition and mental health are enormous. Attention-deficit/hyperactivity disorder (ADHD) is one of the most commonly diagnosed chronic mental conditions of childhood. ADHD has a large genetic component to its etiology, and alterations in the noradrenergic and dopamine systems lead to dysfunction in higher cortical processing related to attention, alertness, and executive functions (e.g., planning, working memory, abstract reasoning, mental flexibility). According to extensive research conducted two food groups that have subsequently been implicated as having a considerable impact on ADHD are essential fatty acids and minerals. Their exists and inversely linear relationship between levels of EFA in the body and the degree of the disorder. A similar inverse relationship has been found with levels of iron in children and symptoms of ADHD, deficiencies in magnesium and zinc have also been noted.

Keywords: *HIV diagnosis, Early reaction, Perception behaviour*

Attention Deficit/Hyperactivity disorder is a neurobehavioral developmental disorder. It is defined as a "persistent pattern of inattention or hyperactivity – impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development." It affects about 3% to 5% of children globally with symptoms starting before seven years of age. ADHD is generally a chronic disorder with

[1] PhD scholar, department of Psychology, Annamalai University, India
[2] Assistant Professor, Department of Psychology, Annamalai University, India
[3] Associate Professor, Department of Psychology, Jyoti Nivas College (Autonomous)
*Responding Author

Received: March 25, 2018; Revision Received: April 16, 2018; Accepted: May 29, 2018

30% to 50 % of those individuals diagnosed in childhood continuing to have symptoms into adulthood. As they mature, adolescents and adults with ADHD are likely to develop coping mechanisms to compensate their impairment. Young kids in general do tend to be impatient and hyperactive; the difference with ADHD is that symptoms are present over a longer period of time and occur in different settings. They impair a child's ability to function socially, academically, and at home.

ADHD is a common childhood illness is a health condition involving biologically active substances in the brain. Studies show that ADHD may affect certain affect areas of brain that allow us to solve problems, plan ahead, understand others' actions, and control our impulses the *American Academy of Child Adolescent Psychiatry* (AACAP) considers it necessary that the following be present before attaching the label ADHD to a child.

- The behaviour must appear before age 7
- They must continue for at least six months
- The symptoms must also create a real handicap in at least two of the following areas of the child's life
  - In the classroom
  - On the playground
  - At home
  - In the community, or
  - In social settings

Identifying ADHD

WARNING SIGNS OF ADHD	
Inattention	**Hyperactivity - impulsivity**
Difficulty in doing any activity at length	Unable to sit at all
Making careless mistakes	Fidgety and restless
Often misplacing belongings	Always running around
Avoiding work that requires attention	Cannot wait for their turn
Starts tracks but get side-tracked	Appears disobedient
Difficulty in meeting deadlines	Interrupts others
Forgetful even in daily routine activities	Acts without thinking
Day dreaming	Always energetic
Leaving work unfinished	Disruptive behaviour

Causes of ADHD

A specific cause of ADHD is not known, there are however, a number of factors that may contribute to it include genetics, diet, social and physical environments.

Genetic factors: - twin studies indicate that the disorder is highly heritable and that genetics are a factor in about 75% of the ADHD cases. ADHD though is not said to follow the traditional model of a "genetic disease" as no single gene has been shown to make a major

contribution to ADHD. It is more like a complex interaction among genetic and environmental factors.

Diet: - the presence of food additives, blood sugar regulation, food allergies and intolerances, and vitamin, minerals and fatty acids deficiencies are considered as suspects in the prevalence of ADHD.

Nutrition affects ADHD in three ways

1. Brain cells, like other cells in the body, need proper nutrition to carry out their functions.
2. The myelin sheath, which covers the axons of brain cells, as insulation covers electrical wires, needs the right levels of nutrients to speed transmission of the electrical signals between brain cells.
3. Neurotransmitters — dopamine, serotonin, and norepinephrine — are also dependent on diet for proper functioning.

Role of Dietary intervention in management of ADHD

There's no evidence that the behavioural disorder ADHD is caused by diet. However, research suggests that for some people, dietary changes can improve symptoms. Since foods and supplements have been shown to influence behaviours a good amount of nutrition research has looked into the effects of foods and supplements on ADHD.

Mostly, two types of studies have been performed
Supplement studies: Supplementing with one or several nutrients.
Elimination studies: Eliminating one or several ingredients from the diet.

Addition of amino acid supplements: - amino acids phenylalanine, tyrosine and tryptophan are used to make the neurotransmitters dopamine, serotonin and nor epinephrine. People with ADHD have been shown to have problems with these neurotransmitters, as well as low blood and urine levels of these amino acids. Hence inclusion of these has shown modest improvement in the individuals with ADHD.

Vitamin and Mineral Supplements:-lower levels of zinc, magnesium, calcium and phosphorous have repeatedly been reported in children with ADHD. An inclusion of these in the diet has shown an improvement in the symptoms.

Omega-3 Fatty Acid Supplements: -Omega-3 fatty acids play important roles in the brain. Children with ADHD generally have lower levels of omega-3 fatty acids than children who don't have ADHD. It is to be noted too that the lower their omega-3 levels, the more learning and behavioural problems the ADHD children seem to have.Omega-3 fatty acids appeared to help improve task completion and inattention. Additionally, they decreased aggression, restlessness, impulsiveness and hyperactivity.

Eliminating Artificial Colorants and Preservatives: - artificial food colours (AFCs) and preservatives are substances seem to affect the behaviour of children, regardless of whether or not they have ADHD. A study followed 800 children suspected of hyperactivity. 75% of them improved while on an AFC-free diet, but relapsed once given AFCs again. Another study found that hyperactivity was increased when 1,873 children consumed AFCs and sodium benzoate, a preservative.

Eliminating Sugar and Artificial Sweeteners: - Soft drinks have been linked to increased hyperactivity, and low blood sugar is also common in those with ADHD. Furthermore, some observational studies have found sugar intake to be related to ADHD symptoms in children and adolescents. Theoretically, it's more likely that sugar causes inattention, rather than hyperactivity, as blood sugar imbalances can cause attention levels to drop.

The Few Foods Elimination Diet

The Few Foods Elimination Diet is a method that tests how people with ADHD respond to foods. Here's how it works:

Elimination: Follow a very restricted diet of low-allergen foods that are unlikely to cause adverse effects. If symptoms get better, enter the next phase.

Reintroduction: Foods suspected of causing adverse effects are reintroduced every 3–7 days. If symptoms return, the food is identified as "sensitizing."

Treatment: A personal dietary protocol is prescribed. It avoids sensitizing foods as much as possible, in order to minimize symptoms.

Research on the effects of food on ADHD symptoms is far from conclusive. Yet diet can have powerful effects on behaviours.

The right diet can have a powerful, positive effect on your cognition, mood, memory, and behaviours. The wrong diet can worsen symptoms of attention deficit disorder (ADHD or ADD). That’s why it’s important to note the best foods for ADHD.

Everything you put on the end of your fork matters. When you eat to improve your health, you improve the quality of your life. Food impacts neurotransmitter levels of serotonin and dopamine, which play a big role in how you feel and perceive the world. Serotonin, for instance, is responsible for mood, sleep regulation, and appetite control.

When levels of this neurotransmitter drop, the results can be mood disorders, anxiety, and negativity. This may be why we crave carbohydrates such as pasta, bread, and chocolate, all of which raise serotonin levels temporarily. Complex carbs, such as apples and sweet potatoes, work the same magic, but don’t set you up for more cravings.Likewise, dopamine helps to increase focus and motivation. Eating small amounts of protein throughout the day can boost dopamine and stabilize blood sugar.It is critical to make sure that the food you eat

is loaded with nutrients that your body is able to properly digest and absorb. Nine simple food guidelines to help heal brain and body.

Rule 1: Eat high-quality calories, but not too many.
Rule 2: Drink plenty of water.
Rule 3: Eat high-quality, lean protein.
Rule 4: Eat smart carbohydrates.
Rule 5: Focus on healthy fats.
Rule 6: Eat from the rainbow.
Rule 7: Cook with herbs and spices.
Rule 8: Make sure your food is clean.

Case Study

Name: S T
Age: 4 years+
General strengths: ST is a bright and cheerful child.
General weakness: ST has been diagnosed with average level of intelligence (84) with ADHD. The diagnoses can be attributed to reduced concentration and sitting tolerance of the child during the assessment His attention span is very short and he is easily distracted by external stimuli. He frequently gets out of his seat and walks around the room.

Nutritional diet

Changes introduced in the nutritional diet:
Withdrawal of sweets, refined flour, additives (boost, bournvitaetc), chicken
Introduction of one fruit a day (apple to improve iron levels),

Changes noticed post introduction of change in nutritional diet:
An increase in sitting time
Willingness to listen to instructions
Increased concentration in topics of interest.

Additional interventions

Occupational therapy and behaviour modification with both the school counsellor and a certified occupational therapist..

Acknowledgments

The author appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interests: The author declared no conflict of interests.

REFERENCES

Akhondzadeh, Shahin. "Zinc Sulfate as an Adjunct to Methylphenidate for the Treatment of Attention Deficit Hyperactivity Disorder in Children: A Double Blind and Randomized Trial." BMC Psychiatry, vol. 4, no. 9, 2004, doi:10.1186/isrctn64132371.

Amber L. Howard, Monique Robinson, Grant J. Smith, Gina L. Ambrosini, Jan P. Piek, and Wendy H. Oddy. "ADHD Is Associated With a 'Western' Dietary Pattern in Adolescents." Journal of Attention Disorders, 2010; DOI: 10.1177/1087054710365990

Bouchard, M. F., D. C. Bellinger, R. O. Wright, and M. G. Weisskopf. "Attention-Deficit/Hyperactivity Disorder and Urinary Metabolites of Organophosphate Pesticides." Pediatrics, vol. 125, no. 6, 2010.

Dosreis, Susan, et al. "Parental Perceptions and Satisfaction with Stimulant Medication for Attention-Deficit Hyperactivity Disorder." Journal of Developmental & Behavioral Pediatrics, vol. 24, no. 3, 2003, pp. 155–162., doi:10.1097/00004703-200306000-00004.

Dr.JitendraNagpal & Ms. Divya S Prasad -VIMHANS Delhi " Common developmental behaviourail& Learning problems in children"

Haslam, Robert, et al. "Effects of Megavitamin Therapy on Children with Attention Deficit Disorders." Pediatrics, vol. 74, no. 1, July 1984, pp. 103–111.

Konofal, Eric, Michel Lecendreux, Isabelle Arnulf, and Marie-Christine Mouren. "Iron Deficiency in Children With Attention-Deficit/Hyperactivity Disorder."Archives of Pediatrics& Adolescent Medicine, vol. 158, no. 12, 2004, pp. 1113.

MD, Eva Selhub. "Nutritional Psychiatry: Your Brain on Food." Harvard Health Blog. Harvard Health Publications, 17 Nov. 2015.

National institute of public cooperation and child development "supportive interventions for children with learning and behaviour problems"

Nigg, Joel T., and Kathleen Holton. "Restriction and Elimination Diets in ADHD Treatment." Child and Adolescent Psychiatric Clinics of North America, vol. 23, no. 4, 2014, pp. 937–953., doi:10.1016/j.chc.2014.05.010.

Pelsser, Lidy M. J., et al. "A Randomised Controlled Trial Into the Effects of Food on ADHD." European Child & Adolescent Psychiatry, vol. 18, no. 1, 2008, pp. 12–19., doi:10.1007/s00787-008-0695-7.

Sameer Parikh &KamnaChibber "Let him not sink, first stes to mental health" – a manual for adults who work closely with children and adolescents, Rupa publication

Schab, David W., and Nhi-Ha T. Trinh. "Do Artificial Food Colors Promote Hyperactivity in Children with Hyperactive Syndromes? A Meta-Analysis of Double-Blind Placebo-Controlled Trials." Journal of Developmental & Behavioral Pediatrics, vol. 25, no. 6, 2004, pp. 423-34.

Schoenthaler, Stephen J., et al. "The Effect of Vitamin-Mineral Supplementation on the Intelligence of American Schoolchildren: A Randomized, Double-Blind Placebo-Controlled Trial." The Journal of Alternative and Complementary Medicine, vol. 6, no. 1, 2000, pp. 19–29., doi:10.1089/acm.2000.6.19.

Tom E.C.Smith, Edward A polloway, James R Patton, Carol A. Dowdy "Teaching students with special needs in Inclusive settings" PHI learning private limited

Wolraich, M L, et al. "The Effect of Sugar on Behaviour or Cognition in Children."JAMA, vol. 274, no. 20, Nov. 1995, pp. 1617–1621.

Wolraich, Mark L., et al. "Effects of Diets High in Sucrose or Aspartame on The Behavior and Cognitive Performance of Children." New England Journal of Medicine, vol. 330, no. 5, Mar. 1994, pp. 301–307., doi:10.1056/nejm199402033300501.

Wurtman, Richard J. "Nutrients That Modify Brain Function." Scientific American, vol. 246, no. 4, 1982, pp. 50–59., doi:10.1038/scientificamerican0482-50.

How to cite this article: Vijayan V, Govind K & Raju R (2018). Managing ADHD with Nutrition – A Case Study Report. *International Journal of Indian Psychology*, Vol. 6, (2), DIP: 18.01.030/20180602, DOI: 10.25215/0602.030

ANNEXURE

What to Eat?

Carbs and ADHD Brain Power

Carbs affect brain function and mood. The rate at which sugar from a particular food enters brain cells, and other cells of the body, is called the "glycemic index" (GI). Foods with a high glycemic index stimulate the pancreas to secrete high levels of insulin, which causes sugar to empty quickly from the blood into the cells. Insulin regulates the ups and downs of blood sugar, and the rollercoaster behavior that sometimes goes with them. Low-glycemic foods deliver a steady supply of sugar, helping a person with ADHD control behavior and improve performance

Foods with the best brain sugars:

Fruits: grapefruit, apples, cherries, oranges, and grapes. Fruits have a lower GI than do fruit juices, because fiber in fruit slows the absorption of fruit sugar. A whole apple is more brain-friendly than apple juice; a whole orange better than orange juice. Please note that the acid in oranges, grapefruits, and their juices interrupts the absorption of short-acting stimulant ADHD medications and should be avoided when taking these prescriptions.

Cereals and grains: oatmeal, bran, higher-fiber cereals and pastas also have a low GI. Corn flakes and sugarcoated breakfast cereals have higher GIs, and should be avoided.

Vegetables and legumes: legumes, such as soybeans, kidney beans, and lentils have the lowest GI of any food.

Dairy products: Milk and yogurt have low GIs, slightly higher than legumes, but lower than fruits. Plain yogurt has a lower GI than yogurt with fruit preserves or sugar added.

Protein and ADHD Brain Power

The brain makes a variety of chemical messengers, or neurotransmitters, to regulate wakefulness and sleep. Studies by Massachusetts Institute of Technology neuroscientist Richard Wurtman Ph.D, and others have shown that protein triggers alertness-inducing neurotransmitters, while carbohydrates trigger drowsiness.

These findings support the popular belief that people with ADHD do better after eating a protein-rich breakfast and lunch.

Proteins affect brain performance by providing the amino acids from which neurotransmitters are made. Neurotransmitters are biochemical messengers that carry signals from one brain cell to another. The better you feed these messengers, the more efficiently and accurately they deliver the goods, allowing your child to be alert at school or you to be more on top of things at work.

Fat, Fish Oil, and ADHD Brain Power

"Fats make up 60% of the brain and the nerves that run every system in the body," says William Sears, M.D., an associate clinical professor of pediatrics at the University of California, Irvine, School of Medicine. "The better the fat in the diet, the better the brain will function."

Most important to brain function are the two essential fatty acids found in fish oil: linoleic (or omega 6) and alpha linolenic (or omega 3). These are the prime structural components of brain cell membranes, and an important part of the enzymes that allow cell membranes to transport nutrients in and out of cells. Western diets contain too many omega-6 fatty acids and too few of the omega 3s, which are found in cold-water fish (primarily salmon and tuna), soybeans, walnuts, wheat germ, pumpkin seeds, and eggs. Flaxseed and canola oils are good sources of omega 3s.

"Individuals with ADHD who have low levels of omega 3s will show the biggest improvement in mental focus and cognitive function when they add more of these healthy fats to their diet," says Richard Brown, M.D., associate clinical professor of psychiatry at Columbia University College of Physicians and Surgeons.

Vitamins and ADHD Brain Power

Vitamin C is required by the brain to make neurotransmitter In fact, the brain has a special vitamin c "pump," which draws extra vitamin c out of the blood into the brain.

Vitamin B6 deficiency causes irritability and fatigue. Adequate levels of the vitamin increase the brain's levels of the neurotransmitter dopamine increasing alertness.

Iron is also necessary for making dopamine.A study showed ferritin levels (a measure of iron stores) to be low in 84% of children with ADHD, compared to 18% of a control group. Low iron levels correlate with severe ADHD.

Zinc regulates the neurotransmitter dopamine, and may make methylphenidate more effective by improving the brain's response to dopamine7. Low levels of this mineral correlate with inattention.

More of these nutrients is not necessarily better, and sometimes problematic. Studies using megavitamin therapy in children with ADHD showed no effect.

What Not to Eat?

Food Sensitivities and Elimination Diets

Studies show that sensitivities to certain foods may worsen symptoms of ADHD in children. When placed on a special elimination diet excluding foods that trigger unwanted behaviour, as many as 30% of toddlers and pre-schoolers benefit, says Eugene Arnold, M.D., author of A Family's Guide to Attention-Deficit Hyperactivity Disorder and professor emeritus of

psychiatry at Ohio State University. He says that such a diet does not seem to have any effect on adults with ADHD.

On an elimination diet, you start by eating only foods unlikely to cause reactions:

1. Lamb
2. Chicken
3. Potatoes
4. Rice
5. Bananas
6. Apples
7. Cucumbers
8. Celery
9. Carrots
10. Parsnips
11. Cabbage
12. Cauliflower
13. Broccoli
14. Salt
15. Pepper
16. Vitamin supplements