



A CCAW PUBLICATION

AUTISM AND *Beyond 5*

**An Indian Perspective
on Biomedical Aspects**

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AUTISM AND *Beyond 5*

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Note from the Writers

‘Autism & Beyond’ Series 5, a Parent Information Book is in continuation with the 2017 release ‘Autism & Beyond’ series. This year, on World Autism Awareness Day (WAAD), 3rd April 2022, Centre for Child and Adolescent Wellbeing (CCAW), New Delhi is proud to release the next issue of the series with special focus on biomedical aspects and interventions in the Indian context.

This resourceful book gives an overview of biomedical basis of autism. We have tried to explain the complicated biological mechanisms in simplified manner to make it easily understandable for the parents. Articles in this issue emphasize on three important biomedical aspects: Gut issues, Methylation and Inflammation. We aim to take up other biomedical aspects in upcoming issues of this series.

We are thankful to all the CCAW team members for their excellent and dedicated work in bringing out this Parent Information Book. We truly believe that with this endeavor, we at CCAW have added another tiny drop to the vast ocean of support required by the ASD community.

We are highly grateful to all the families with an ASD member, Akhil Autism Foundation (USA), and our families for their continuous love, support and encouragement. We hope that in the future, we at CCAW, will continue to develop more and more resources that will be helpful and beneficial to parents and care takers.

With our deepest commitment to the ASD community...

Best wishes

Dr. Deepak Gupta, *Child & Adolescent Psychiatrist*

Dr. Nabanita Sengupta, *Child & Adolescent Psychiatrist*

Ms. Shreya Tandon Mago, *Psychologist & Special Educator*

Foreward

‘**AUTISM and Beyond 5**’ is a must read for every parent, professional and caregiver and this comes from my personal experience. Our son Akhil Lad who now is 20 yrs old was diagnosed with AUTISM at 18 months. We accepted his diagnosis without going into depression and telling ourselves Akhil has come in our lives for specific reason and may be we have to give a lot to the society. With this thought we started working with Akhil and its been 20 yrs now Akhil has managed to face all the challenges and being minimally verbal is now taking Associate Science Degree at Rowan College of South Jersey. In 2007 during my visit to India for a conference, I met Dr. Deepak Gupta and was extremely happy to see he was the only one mainstream doctor who asked me “Is Gluten Free Diet helpful for the children?” We exchanged our details and since then and now Dr. Deepak Gupta and his team has done a marvelous job. Akhil Autism Foundation is thankful to CCAW for not only educating parents but starting them on the first line to treatment of MethlyB12 shots. I wish we had such a AUTISM and Beyond book as it covers all the aspects for treating an individual with AUTISM. Gut and Brain connection is commonly seen as an issue in many individuals and glad to see this is covered very deeply. Methylation cycle plays a critical role in detoxification and can help with many other behaviors. Reading about the protocols and treatments shows CCAW team is openminded and respect parents views and concerns. We entire Akhil Autism Foundation are thankful again to CCAW team and will request each parent, caregiver and professional to read Autism and Beyond 5 book.

Manisha Lad



Executive Director

Akhil Autism Foundation

My Journey.. My Hope....

During my post-graduation and in my early learning years, my exposure to Autism was limited; so, I never truly understood what it would be like to be a child with Autism. It was only during my post-graduation years, when I worked with a family in Manipal as a trainee psychiatrist who had a child with ASD. That was my first learning for what is a child with ASD.

In my further training in London, my understanding about ASD expanded and I understood the importance for multidisciplinary team approach under Professor Patrick Bolton at Michael Rutter Centre for children and young people (Kings College, London). During my initial professional years and my private practice, I gradually started seeing more and more children with Autism Spectrum and related disorders.

My emphasis was on multidisciplinary team approach including psychoeducation of parents, therapies and if required psychotropic medications. It was during these years; working with parents I learnt various aspects, which were quite challenging and overwhelming for them but were never addressed by doctors and therapist including me. Despite the children being on medication and various interventions, a lot of their questions were left unanswered. I still remember this young 5-year-old boy with ASD and behavioral challenges who was on various psychotropic medications. One thing, which emerged rather prominently, was that his behavioral problems were associated with his stomach related issues. Gradually, I found that there are so many children who have various medical issues especially gut issues, poor immunity, are prone to allergies and infections which in turn impact their learning and behavior. In 2007, I met Ms. Manisha Lad, a parent, living in New Jersey, who has a child with Autism. As my interaction and communication increased with her over the years and the more I read about medical issues in ASD, my understanding of the diverse biomedical issues in children with Autism deepened. This also showed me a new ray of hope for children with Autism; that while working on certain biomedical issues, with other therapies, behavioural concerns decreased radically, and social communication skills improved.

The year 2009 was a turning point in my career as a child psychiatrist working with children with ASD. In October 2009, I went to Dallas (USA) supported by Akhil Autism Foundation, New Jersey (USA). That was an eye-opening experience for me. For the first time, I met a very big community of parents & professionals and was humbled by their belief in biomedical intervention. Since then, I presented various papers in conferences on MB12 injections and HBOT. This was a major stepping-stone for me in helping children with autism. With all my learning and experience and as I became more involved with the ASD community, I began to firmly believe that bio medical intervention is an essential part in the treatment of ASD.

Now, in 2022, although there is an abundance of research available with many ongoing research, there are still a lot of unanswered questions. What gives me immense contentment is, looking back at many children with ASD who have been under my care since early childhood, undergoing intensive therapies and biomedical interventions, have got admission in mainstream schools and are doing well. It gives me immense hope for children with ASD and encourages me to never give up.

Gradually, my understanding of ASD has changed from an illness model to a multi-faceted condition with various complex medical causes. Every child on the spectrum is unique and requires a thorough investigation with a detailed planning for optimal output. I am thankful to the parent community for being so thoughtful and helpful to me in all my endeavors. I owe it to the parents for motivating to initiate the entire biomedical journey and am deeply grateful for their constant support all throughout. Seeing parents so motivated and committed towards their children inspires me and instills passion to do better. Over the years, working with the ASD community, I have learnt a few of the most important things in life, like, perseverance and with the zeal and motivation to strive for better, winning over the most challenging cases. The strength and heroism of ASD community has sparked and brought the best out of me. I am humbled by the entire ASD community and salute them with deep gratitude.

For them always,
Dr. Deepak Gupta

Introduction to Biomedical Treatments for Autism

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder with impairment in social and communication skills along with restricted and repetitive interests and behaviours. Research shows that children on the autism spectrum have high rates of associated medical conditions, such as gastrointestinal problems, nutritional deficiency, methylation defects, immune dysfunction, impaired detoxification, oxidative stress, sleep problems etc. A child is unlikely to make meaningful progress in even the best educational program if these biomedical mechanisms at the level of the cells in the brain and their chemical environment are not functioning well enough for new learnings to happen. Biomedical treatment modalities address these underlying issues so that holistic development of the child can take place.

In the field of autism therapy, the term “biomedical” is widely used to refer to a specific approach that considers biological basis of autism and targets these specific biological processes that impact brain function and development. These alternative treatments are proposed by the Autism Research Institute, USA (1995); and are not FDA approved. These are mostly supplements, and not proper psychiatric medicines. Biomedical treatment is not a substitute of traditional therapies; it gives a hope and believes “*Autism is treatable, and recovery is plausible.*”

The goals of biomedical treatment are:

- To identify and treat the full range of underlying medical conditions
- To achieve optimal health
- To maximize both safety and efficacy- this requires careful consideration of all the risks and potential benefits associated with different therapeutic modalities.

From the last 15 years, we have been following the “Biomedical Approach” with promising results in children with ASD; especially with GFCF diet, treating gut dysbiosis and nutritional deficiencies, supplements such as omega-3 fatty acids, oral methylcobalamin, subcutaneous MB12 injections, N-Acetyl Cysteine (NAC), antioxidants, Hyperbaric Oxygen

Therapy (HBOT), detoxification etc. Along with biomedical interventions, other therapies are encouraged and continued.

The following chapters will give a simplified view of three important aspects of biomedical approach; i.e., gut issues, methylation problems and inflammation. We plan and hope to continue this series in our upcoming publications where we plan to address other biomedical aspects of ASD.

Autism Spectrum Disorders and Gastrointestinal Problems: Understanding the Overlap

Gastrointestinal (GI) problems have been frequently documented in children with autism spectrum disorder (ASD). Almost 40-80% of children with ASD suffer from at least one GI symptom, and they tend to suffer more from GI symptoms as compared to their neurotypical counterparts (Al-Beltagi et al, 2021).

A survey conducted in 2019 reported that out of 340 children on the autism spectrum, 65% suffered from constipation, 30% had diarrhoea and 23% experienced nausea (Ferguson et al, 2019).

Common GI problems in children with ASD

- Constipation
- Diarrhoea
- Gas and bloating
- Nausea
- Vomiting
- Reflux
- Abdominal pain
- Excessive flatulence
- Foul smelling stool

The severity of GI symptoms is significantly correlated with the severity of autism. ASD children with comorbid GI problems display increased mood fluctuations, trouble sleeping, hyperactivity, self-injury, aggression, anxiety, sensory responsivity, lack of expressive language and social impairments when compared to ASD children without GI comorbidities.

What is the link between GI problems and ASD?: The answer is Brain-Gut-Microbiota Axis

The brain-gut-microbiota axis is a bidirectional connection between the brain and the gut and microbiota (the microorganisms in the gut) where signals from brain influence the functions of the gut and conversely visceral messages from gut microbiota influence the brain functions.

The first 1000 days of life (including prenatal life) is critical for establishing a healthy and protective gut microbiota. One's microbiota begins to develop rapidly following birth, which is influenced by factors such as the mode of delivery, infant feeding practices, antibiotics use etc. Factors such as maternal infection and stress, cesarean delivery, formula feeding, indiscriminate use of antibiotics, exposure to heavy metals, toxins and pollutants may alter the gut microbiota; i.e, the healthy microorganisms are outnumbered by the pathogenic bacteria and fungus (*gut dysbiosis*). These pathogenic microorganisms release harmful chemicals and toxins which cause intestinal inflammation and widen the gap between the cells of intestinal wall (*leaky gut*). These inflammatory cells along with the chemicals and toxins released by the pathogens escape into the blood circulation through these widened gaps and reach brain where they negatively impact the cognitive, socio-emotional and language development.

Signs Your Child May Struggle with GI Problems

Communicating pain and discomfort is difficult for any child; more so for those in the autism spectrum owing to their limitation in speech and communication.

Signs that your child may be experiencing GI problems include:

- Applying pressure to their abdomen
- Coughing too much
- Chewing on clothes and fingers, licking objects
- Hyperactivity, restlessness
- Sleep disturbances
- Eating too less or too much
- Teeth grinding
- Self-hitting, pinching, biting
- Laughing to self
- Frequent urination, difficulty in toilet training
- Anal scratching
- Diaper rash

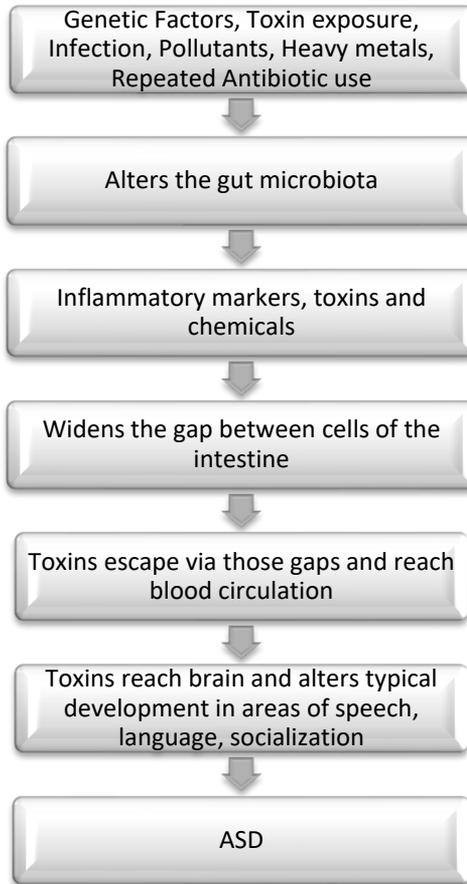


Fig: 1: Flowchart depicting the relation between genetic and environmental factors, gut microbiota and ASD

What Can We Do? The 3 R's

Remove and eliminate toxins	<ul style="list-style-type: none"> • Refined sugar/ Refined oil/ Refined flour • Processed food/ Packaged food/ Pesticides/Plastics • Microwave/ Mobile/ Monitors • Specialized diets
Replenish Nutrients	<ul style="list-style-type: none"> • Correct deficiencies by supplementing nutrients,

	vitamins and minerals
Restore functions	<ul style="list-style-type: none"> • Heal the gut by probiotics, digestive enzymes • Antifungal /antiparasitic treatment wherever appropriate

The basis of above interventions is to remove what is causing harm, add what is deficient and to heal the damage that has already been done to the person on the autism spectrum.

A Note on Specialized Diets (Julie Matthews, CNC 2007)

DIET	BENEFITS
Organic diet: Removing Food additives, colorings, preservatives, pesticides	Reduces hyperactivity, better awareness
Feingold Diet: Restricts high phenolic foods, including all artificial ingredients and high salicylate fruits like apple, berries, cherries, raisins etc	For red cheeks, red ears, hyperactivity, irritability, aggression (54% overall improvement)
GFCF (Gluten Free Casein Free) Diet: No gluten (replace wheat, rye, barley, oats etc with bajra, rice, ragi, jawar) or casein (replace dairy with almond milk, coconut milk, rice milk or hazelnut milk)	Improvements in social interaction, communication, and overall behavior (69% overall improvement)
Specific Carbohydrate Diet: Restricts carbohydrates to only fruits, non-starchy vegetables, and honey. No grains, starchy vegetables, or milk	For bowel inflammation, diarrhea, gut dysbiosis that is not improving. (72% overall improvement) <i>At CCAW, we have used SCD on 15-20 children with improvements in their behaviors such as restlessness, laughing to self, sensory issues and sleep.</i>

Body Ecology Diet: Includes seven principles of eating and healing such as maintaining p ^H balance of body, including fermented foods etc.	For yeast overgrowth (54% overall improvement)
Low Oxalate Diet: Removes high oxalate foods such as tea, coffee, chocolates, okra, spinach, pea nuts	For pain (body or GI), urinary incontinence, continued stinging after meals, poor growth

The Nemechek Protocol

Recently, the Nemechek Protocol has been found to be effective in some children with ASD. It was developed by Dr. Patrick Nemechek to help children with ASD and other developmental delays by addressing gut dysbiosis and reducing gut and brain inflammation. It involves administering prebiotic inulin or a prescription antibiotic Rifaximin, fish oil to provide omega-3 fatty acid, and extra virgin olive oil (EVOO) to provide omega-9 fatty acids along with reduction of dietary omega-6 fatty acid by eliminating processed and packaged food. Additional anti-inflammatory action is achieved by vagus nerve stimulation (VNS) in which a mild electrical current is applied to the vagus nerve by an electrode clip that fits comfortably on the ear. Parents report that young children on the Protocol often show improvement in gastrointestinal problems, speech, sensory issues and social interaction within two to three months, while teens and young adults may take longer.

At CCAW, we prescribe specialized diets GFCF, SCD, low oxalate diet, supplements such as omega-3 fatty acids, probiotics and digestive enzymes, and treatment for specific infections (antifungal/ antiparasitic/ antiviral protocols) wherever applicable. Improvements are noticed in areas of eye contact, speech, communication skills, socialization, cognitive awareness, sensory issues, repetitive behaviors, sleep and physical health.

Conclusion

More and more research and awareness is required to identify and address the GI problems in children with ASD. In many cases, the child may not show sufficient progress with therapies until and unless their GI problems

are taken care of. Chronic GI problems don't just make the ASD symptoms worse; they can also lead to long term health issues. It is always advisable to consult a doctor before implementing significant dietary modifications for the child.

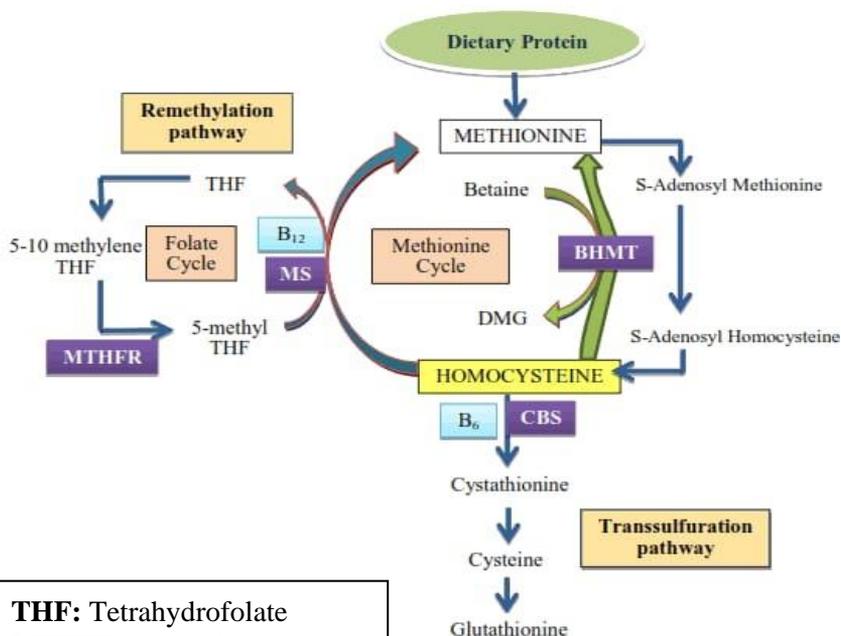
Methylation and Autism Spectrum Disorder: Is There A Possible Link?

What is Methylation?

Methylation is a biochemical process of transferring a single carbon atom and three hydrogen atoms (CH₃), collectively referred to as a methyl group, from one substance to another in the body. It occurs billions of times per second in every cell of body. It is a very complex process that is fed by different systems, and it feeds into various other interdependent systems.

Various factors such as genetic mutations, oxidative stress, heavy metal load, dietary deficiency of vitamins, minerals and amino acids etc can hamper this process from running smoothly.

Methylation defects have been associated with many clinical conditions such as autism, ADHD, depression, cancer, cardiovascular diseases etc.



- **THF:** Tetrahydrofolate
- **MTHFR:** Methylene tetrahydrofolate reductase
- **MS:** Methionine Synthase
- **BHMT:** Betaine Homocysteine S-Methyltransferase
- **CBS:** Cystathionine B Synthase

FIG. 1: Methylation Cycle

What are the Functions of Methylation?

Methylation is involved in various important metabolic pathways in our body. Some of the important functions relevant to neurodevelopment are:

- Cell division
- Gene expression, production and repair of DNA
- Immune system regulation
- Glutathione synthesis and detoxification
- Production and function of proteins
- Regulating inflammation
- Producing melatonin, CoQ10, carnitine, creatine, and choline
- Development of the nervous system
- Neurotransmitter synthesis like serotonin and dopamine
- Histamine clearance

What is the Link between Impaired Methylation and Autism Spectrum Disorder?

- **The *MTHFR* gene** governs the production of methylenetetrahydrofolate reductase (*MTHFR*) enzyme which plays an important role in the process of methylation. *MTHFR* genetic variants, such as the *C677T* and *A1298C* reduce *MTHFR* enzyme activity in the body and adversely affect methylation. The frequency of the *C677T* and *A1298C* variant is higher in children with ASD than in normally developing children; this finding suggests that altered methylation play a role in autism.
- **Folate receptor autoantibodies (FRAAs)** bind to folate receptor A (FRA) in the brain, preventing folic acid from entering the brain. Blocked folate receptors cause cerebral folate deficiency, which impairs methylation and brain function. Children on the autism spectrum have a high prevalence of FRAA compared to neurotypical children. In children with folate receptor autoantibodies, folate must be delivered to the brain via a route that bypasses the blocked receptor. Folinic acid, a non-methylated form of folate, readily crosses the

blood–brain barrier and has been found to improve verbal communication in children with ASD.

- Methylation is catalyzed by several enzymes that require specific dietary micronutrients, including folate, riboflavin, vitamin B6, vitamin B12, choline, betaine, zinc, and magnesium. A deficiency of these nutrients impairs methylation. Furthermore, research indicates that a Westernized diet high in refined, processed foods alters methylation in the brain and impairs cognitive function; these findings suggest the existence of an important link between the consumption of a processed, nutrient-depleted diet, methylation and ASD.
- Gut dysbiosis, viral infection during pregnancy, exposure to heavy metals, toxins and pollutants can impair methylation by modulating gene expression; and subsequently increase risk of autism spectrum disorders.

How Can we Test Methylation Problems?

- Standard laboratory tests are of limited use in assessing underlying methylation deficits and need for supplementation, since the issue is more with a functional metabolic imbalance, rather than a classic vitamin deficiency.
- **Identifying MTHFR genetic variants** may be advised to address methylation problems in ASD children.
- Functional methylation testing (**Methylation panel**) can be done in conjunction with genetic testing.

What are the Treatment Options to Target Methylation Problems?

- A diet rich in micronutrients required for methylation including folate, riboflavin, vitamin B6, vitamin B12, zinc, magnesium etc should be advised.
- Correcting gut dysbiosis with specialized diets, antimicrobials, fermented foods, and probiotics can help restore balance to the intestinal microbiota and optimize methylation.
- Women looking to become pregnant should focus on supporting their immunity to reduce their risk of infection during pregnancy and treat pre-existing infections before conception.

- Environmental toxins should be avoided as much as possible during pregnancy, infancy, and early childhood to reduce the risk of autism.
- The use of MB12 injections for the treatment of ASD was pioneered by Defeat Autism Now! (DAN) practitioner, Dr. James Neubrandner. It is estimated to be effective in 72% of children with autism in a 27,000 parent survey by ARI 2009 (ARI Publ. 34/March 2009). Sublingual MB12 drops are also available.
- Other nutrient supplementation to support methylation such as:
 - Folate
 - Dimethylglycine (DMG)
 - Trimethylglycine (TMG/ Betaine)
 - S-Adenosyl Methionine (SAME)
 - Vitamin B6
 - Zinc
 - Magnesium
 - Choline
 - Creatine
 - Glycine

• **Comparison between Overmethylation and Undermethylation in ASD: A Guide to Supplementation**

Characteristics	Undermethylators	Overmethylators
% in ASD population	45%-85%	10-15%
Genetic mutation	MTHFR (especially C677T, but also A1298C), MS, BHMT, MAT	CBS, COMT , AGAT
Biochemical indicator	Elevated histamine	Decreased histamine, elevated homocysteine
Allergies	Seasonal inhalant allergies, urticaria,	Several food/ chemical allergies

	autoimmune diseases	
Pain threshold	Low	High
Body temperature	Hot body temperature, profuse sweating	Low body temperature (hand/feet), sparse sweating
Hair	Weak hair growth	Hirsutism (excess hair growth)
Skin	Oily skin, acne	Dry skin, eczema
Behaviour	Gloomy, calm demeanor, lack of empathy, oppositional, more ritualistic behaviour	Cheerful, agitation, restless, hyperactivity, better socialization
Psychopathology	Depression, OCD	High anxiety, panic, psychosis
Supplements	<p>Methyl donors like:</p> <ul style="list-style-type: none"> • TMG • DMG • Methyl-B6 (P5P) • Methylated folic acid (folinic acid or methyltetrafolate) • SAMe • MB12 <p>(Tolerates methyl donors)</p>	<ul style="list-style-type: none"> • HB12 • adenosyl B12 • folic acid • niacin (or niacinamide) • B-6 • Choline <p>(Hyperactivity, sleep disturbance etc, with methyl donors)</p>

What are the Improvements Parents Can Expect with Methylation Support?

- Improved attention and focus

- Improved awareness and response
- Improved eye contact
- Improved receptive and expressive language
- Improved socialization and peer relationships
- Improved emotional control
- Improved physical energy

At CCAW, a follow up prospective study of 75 children on MB₁₂ injections in ASD was presented at the “7th Congress of Asian Society for Child & Adolescent Psychiatry & Allied Professions [ASCAPAP]” (Gupta, D & Tandon, S; *Role of M-B12 Injections in Autism Spectrum Disorder. September 2013*). 46 children i.e. 61.3 % of the cases showed remarkable improvement, especially in sociability and eye contact. Also an increased social responsiveness, understanding, and alertness were reported. Although complete speech wasn't reported, in 54 children i.e. 72% of the cases, children showed an inclination towards being more verbal. Of the total 75 cases, only 4 children (5%), reported no significant change in their behaviours and stopped M-B12 injections.

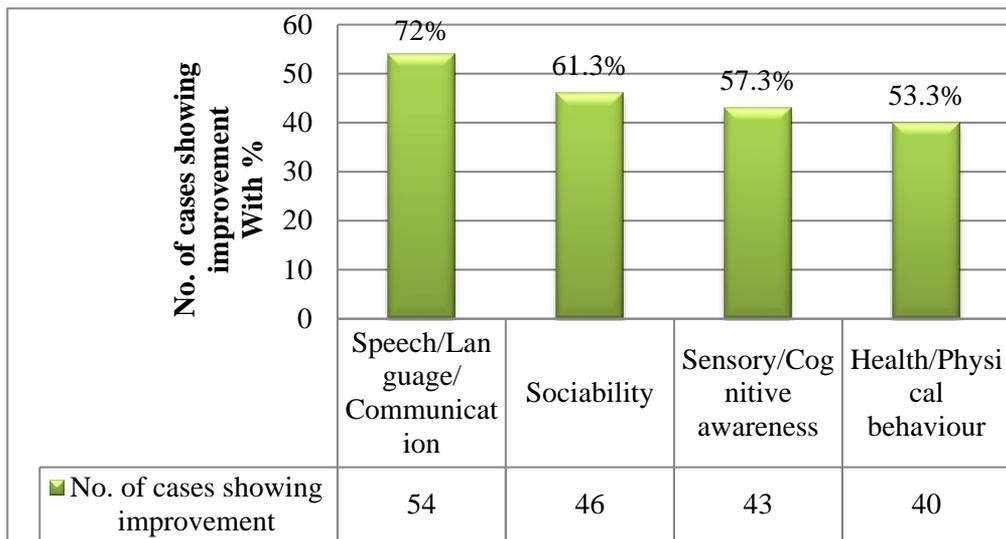


FIG 2: Improvements with MB₁₂ injection in children with ASD

(Study conducted at CCAW)

Take Home Points

- Methylation is a complex biochemical process that is an integral part of various important functions of our body.
- Numerous genetic and environmental factors have been linked to impaired methylation process.
- Methylation defects have been found to be associated with a significant population of children with ASD.
- Correcting the underlying methylation defects may lead to significant improvement in a number of children on the autism spectrum; most improvements are noticed in the domains of speech, language and socialization.

Inflammation and Autism:

Is This the Missing Piece of Puzzle?

What Is Inflammation?

Inflammation is a process by which our body fights an infection or injury. Under normal circumstances when we encounter an injury or a ‘foreign’ substance—a bacteria, virus or toxin, our immune system sends a cascade of inflammatory chemicals such as cytokines to fight off the invader and to heal the injury. When the battle is over, an anti-inflammatory process begins and calms the body down again.

In some people, however, this process of ramping up and cooling down does not go smoothly. Those people can be stuck in a constant state of inflammation in which the immune system triggers inflammatory reaction against their own cells, thereby damaging the own body in the process.

Inflammation and Autism Spectrum Disorder: Is there a Connection?

Latest research points towards a possible link between chronic inflammatory state and immune system dysregulation associated with ASD.

Inflammation before Birth

- *Mothers who have certain autoimmune conditions* such as asthma, rheumatoid arthritis, celiac disease, SLE etc. are at greater risk of having children with ASD. Women with autoimmune diseases are more likely to produce *antibrain antibodies* which can attack the brain tissue of a developing fetus.
- Women who suffer from *viral infection during pregnancy*, especially the 1st trimester of pregnancy, are at increased risk of having children in the autism spectrum.

Ongoing Inflammation after Birth

- Symptoms of immune system abnormalities, such as *frequent infections, allergies (including food sensitivities) and increased prevalence of autoimmune conditions*, were frequently reported among children with ASD.

- The dysregulated immune functions in people with ASD are reflected by *abnormal cytokine levels in their body fluids*. More specifically, levels of pro-inflammatory (e.g., TNF alpha, IL-6) are shown to be elevated in the cerebrospinal fluid (CSF) and serum of people with ASD, whereas levels of anti-inflammatory cytokines IL-10 and TGF- b are lower.
- The gastrointestinal system has a direct connection with the immune system. ASD-associated gastrointestinal symptoms can be viewed as a manifestation of an underlying inflammatory process. Many children with ASD have allergy to wheat (Gluten) and cow milk protein (Casein). Increased intestinal permeability is found to be associated with 37% children with ASD (*leaky gut*) (Li et al, 2017). ASD children on gluten-casein-free diet (GFCF) shows significantly lower intestinal permeability than those who are on an unrestricted diet.
- Up to a third of people with autism also develop *seizure disorders*—the prevalence of seizures in people with ASD is 10 times higher than in the general population (Frank et al, 2018). Some researchers suggest that seizures in persons on the autism spectrum may have an origin in brain inflammation; and treating this inflammation may aid in better seizure control.

What are the Available Treatment Options to Target Inflammation in Children with ASD?

- Research shows consumption of processed and packaged foods, food high in refined sugar and preservatives etc. increase inflammation in body. An organic diet removing these food additives, colorings, preservatives etc has shown to have better outcome among children with ASD.
- 69% children in the autism spectrum who were on strict GFCF diet have shown to have better eye contact, awareness, social interaction and decreased repetitive behaviour.
- Supplements with anti-inflammatory properties such as Tulsi, Curcumin, Omega-3 Fatty Acids, L-Carnosine, Vitamin A, Vitamin C etc. has shown improvements in cognitive and social domains of a subgroup of children on the autism spectrum.
- Hyperbaric Oxygen Therapy (HBOT) involves inhaling up to 100% oxygen at a pressure greater than one atmosphere (usually 1.3-1.5 atm)

in a pressurized chamber. HBOT has been reported to increase oxygen supply to brain and also decrease the production of pro-inflammatory cytokines (including TNF-alpha, interferon-gamma, IL-1 and IL-6), as well as increase anti-inflammatory IL-10 levels. Several case studies have reported behavioral improvements in individuals with ASD from treatment with HBOT in areas of social interaction, speech and language, and cognitive functioning.

At CCAW, we studied the effects of HBOT on 50 children with ASD. Results (monitored on ATEC) have shown improvement in understanding, cognition, eye contact, speech & language.

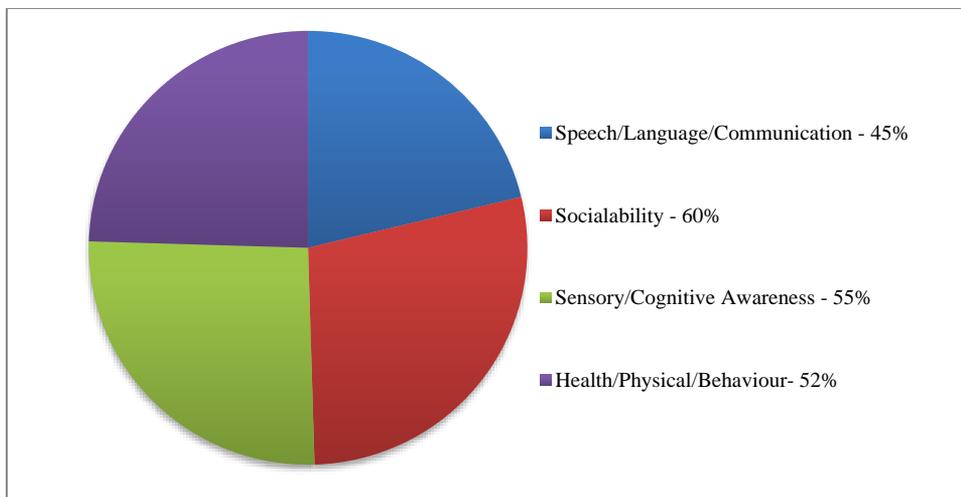


FIG 1: The effects of HBOT on children with ASD (Study conducted at CCAW and Poster presented at World Federation for Mental Health (WFMH), New Delhi, Nov 2017)

Take Home Message

- Inflammation and immune abnormalities have been shown to be an important factor in development of ASD.
- Several ASD-associated symptoms (i.e., seizures, gastrointestinal problems) could be influenced by altered immune functions.
- Treatments aimed to modulate inflammation such as GFCF diet, HBOT, supplements such as Tulsi, Omega-3 fatty acids are some of the useful therapeutic modalities for children with ASD.

Testimonials from Parents

“I am very glad to inform that biomedical interventions had given success for my child. My trust on biomedical interventions is mainly due to focus on good food vis-a-vis good gut supported with supplements as required, good sleep vis-a-vis good mind supported by right medication if required along with the support of therapies based on the need of the child. I believe biomedical is the safest protocol and if adopted at early age then success is sure. I am sure biomedical will gain popularity in coming days in our country with more awareness and success stories.”

Mr. Apurba Dey Singha, Kolkata

“We would like to thank Dr Deepak Gupta for guidance and biomedical intervention which helped us a lot dealing with our kid’s issues. Biomedical helped us in controlling his hyperactivity, focus, concentration, appetite and improve in various areas. Following GFCF diet, therapies and biomedical altogether helped us and today my son is 80% close to Neurotypical kids. Once again thank you Deepak Sir.”

Mr. Pramod Mishra, Noida

“Through this column I want to thank Dr. Deepak Gupta ji for his help, guidance and valuable biomedical treatment which healed, reversed and transformed the life of my autistic child. With the help of his biomedical treatment and therapy my child is now living a normal life. I wish him all the best for his journey. He is doing a tremendous job bringing a ray of hope for many lives. God bless him always.”

Ms. Sarita Beniwal, New Delhi

“We have seen dramatic improvement in our son’s speech (fully conversational now), eye contact, response to name and ability to focus. He has improved so much that his autism has become almost indistinguishable. Now I realize the importance of GFCF diet (overall healthy life and diet) and how it impacts our mental and physical health. Also, all your advice has done wonders to our son. Many thanks and gratitude.”

Ms. Farah Huque, Dhaka, Bangladesh

“I have very little knowledge about biomed, but as my son Eenesh is undergoing biomed treatment, and we found it’s helpful for him.”

Mr. Rana, Dhaka, Bangladesh

“My son Tanay Pai was diagnosed with autism at the age of 2.5 years. He was nonverbal, had behavioural issues, poor eye contact, repetitive behaviour etc. I started biomedical treatment for my child one year back from Dr. Deepak Gupta. I found very good improvement in my child. My son who was nonverbal has now started speaking in sentences, his aggressive behavior has completely stopped, gives good eye contact, understanding and awareness has significantly increased. I am happy that I had started biomedical treatment for my son at the right time and I am very much thankful to Dr. Deepak Gupta for giving the best treatment.”

Ms. Shilpa Prabhu, Bangalore

“Biomedical intervention has helped my child with improved social behaviour, language development, focus/concentration and self awareness. I would advice all parents of children with ASD/any other neurological issues to consider biomedical intervention as an important treatment for their kids.”

Ms Khan, Bangalore

About Centre For Child & Adolescent Wellbeing (CCAW)

Centre for Child & Adolescent Wellbeing (CCAW), New Delhi is one of the few unique multispecialty centers in India which provides specialist/ specialized health care for children, adolescents, and young people with emotional, behavioral, neurodevelopment and educational problems in a child friendly environment through a multidisciplinary team approach.

- CCAW is a multispecialty centre with specialists and professionals under one roof for well integrated services.
- CCAW has trained and experienced professionals from various hospitals, schools and organizations working exclusively with children and adolescents since many years.
- CCAW is a child and adolescent friendly setup with "multimodal holistic" approach to help children, adolescents and young people.
- CCAW is an exclusive multispecialty centre dedicated for emotional, social and psychological needs of children, adolescent, young people, parents and families.
- CCAW is a multidisciplinary setup committed for children and adolescents with ASD and related disorders providing services at primary, secondary and tertiary levels.
- We undertake research work to further our understanding of child and adolescent mental health.
- We organize workshops and training programmes for parents, children and professionals to spread awareness as well as train them in this field.

Services Available at CCAW

Bio Medical Intervention

- **Specialised Diet (GFCF and others)**
- **Nutritional supplements (Omega 3 fatty acid and others)**
- **Advanced biomedical testing and treatment**
- **MB12 Injections-** is one of the treatments for children with Autism Spectrum Disorder (ASD). One of the many tasks MB12 does is to raise the levels of Glutathione; Glutathione is the substance the body uses to detoxify itself and has been shown to be consistently low in children with ASD
- **Hyperbaric Oxygen Therapy (HBOT)** - involves inhaling 100% oxygen at greater than one Atmospheric Absolute (ATA) in a pressurized chamber. It is helpful in children with Autism Spectrum Disorder (ASD) and other indications.

Captain's Log's Mind Power Builder

It is a computer gaming software that specially work on exercising the brain. Different games train different abilities or skills.

Early Intervention Services (EIS)

This is available for children with Autism Spectrum Disorders (ASD) who are below the age of 5years with a purpose to integrate them into playschool/ integrated/inclusive school set-up.

EmoAid Program

This is a preventive psychological program which teaches a combination of carefully curated tools and skills for enhancement of emotional wellbeing on a daily basis.

Occupational Therapy

It provides intervention which will help you regain function, maintain level of functioning, or make accommodations for any deficits you may be experiencing.

- **Brain Gym-** It focuses on the performance of specific physical activities that activate the brain for optimal storage and retrieval of information.
- **Sensory Integration-** is the neurological process that organizes sensation from one's own body and the environment, thus making it possible to use the body effectively within the environment.

Online (web) Counselling

This service was initially designed for clients based outside Delhi and India who might find it difficult to come to the centre. However, during the Covid-19 lockdown, it has allowed us to cater to the population from Delhi as well as helped us to reach remote corners of the country and provide our services.

Parenting Services

We conduct parenting classes consisting of Common sense parenting (USA) and Reproductive Health Care (UNICEF). This service addresses everyday challenges parents face with their children.

Pharmacotherapy (medication) for emotional, behavioral and psychiatric disorders in children, adolescents and young people.

Psychological Assessments

It is a formal assessment conducted using tools like, psychological tests, questionnaire, rating scales and interviews. It contributes to the understanding of an individual's behavior, capabilities and personality.

Psychological Therapies

In psychotherapy, psychologists apply scientifically validated procedures to help people develop healthier, more effective habits. There are several approaches of psychotherapy followed at CCAW

- **Arts Based Therapy (ABT)-** is the clinical and evidence based use of art forms (music, drama, and visual arts) to accomplish goals within a therapeutic relationship.
- **Counselling for children, adolescents and families**

- **Eye Movement Desensitization Reprocessing (EMDR)**- is a WHO approved trauma-based therapy effective in Post Traumatic Stress Disorder (PTSD), anxiety and depression related to any psychological trauma.
- **Emotional Freedom Technique (EFT)**
- **Expressive Art Therapy**
- **Group Therapy and social skills training**

Special Education

It is a process that involves individually planned and systematically monitored arrangement of teaching procedures, adapted equipment and materials, and other interventions designed to help learners with special needs.

Speech and Language Therapy

It is concerned with the management of disorders of speech, language and communication in children.

Training Programs & Workshops

1. For Children and Adolescents and Parents

- Parent Empowerment Program (PEP)- for parents of children with Autism
- Spectrum Disorder
- Psychoeducation for parents about various mental health concerns
- Responsible Childcare Parenting Classes
- EmoAid Program

2. For Professionals, Schools, Institutions and NGOs

- ‘Hum Sath Sath Hain’- An Autism awareness community program for play schools

- Responsible Childcare (Certified by Love Humanity USA) – Train the facilitator course
- Internship programs for undergraduate and postgraduate psychology students, developmental therapists, special educators
- The Birds & The Bees- training teachers/school counselors on how to give sex education to children
- Working with CAMHS- Basic skills training CAMHS
- ELC Mental Health Summer Program- program for school students with passion for the field of mental health
- Mental Health Awareness Programs for schools



The Centre for Child & Adolescent Wellbeing (CCAW) is a multidisciplinary institution in New Delhi, India, providing various Child & Adolescent Mental Health Services (CAMHS) and *nurturing lives* since 2005. In this 5th issue of CCAW's 'Autism and Beyond' series, Dr Deepak Gupta and his team discuss their perspective on biomedical intervention in children and adolescents with Autism Spectrum Disorder (ASD).

This book presents an Indian perspective drawn from more than 14 years of biomedical practices and experiences of professionals and parents in the ASD community.



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