

OPTIMAL NUTRITION IN AUTISM SPECTRUM DISORDERS.

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What is ASD?



- Autism Spectrum Disorders(ASD) refer to a broad range of conditions characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication. It is a developmental disorder that affects information processing.
- According to Center for Disease Control, about 1 in 44 children is identified with autism spectrum disorder (ASD).
- ASD is reported to occur in all racial, ethnic and socioeconomic groups.
- ASD is more than 4 times more common among boys than among girls.

Optimal Nutrition?

- Optimal Nutrition is **the ideal intake of nutrients for an individual in order to achieve optimal health**. Optimal health can be defined as the most efficient functioning of the human organism - body and mind.

5 Essential Nutrients to Maximize Your Health

- Carbohydrates. Main function - Provide energy.
- Protein. Main function - Build and repair tissues.
- Fats. Main function - Provide backup energy.
- Vitamins and Minerals. Main function: Maintain optimal health.
- Water.



Is there a relationship between Diet/Nutrition/GI Tract/Feeding and Autism?

- Research suggests that food/nutrition plays a critical role in the development of autism and the escalation of ASD symptoms.
- Food-related issues, such as selective eating and nutritional deficiencies are often manifestations of ASD.
- Diet therapies have been proposed to prevent or manage ASD.

- There is a broad consensus within the research community that autism is caused by a wide range of factors including both genetic characteristics, and environmental influences.
- Most scientists also agree the pathogenesis of ASD begins during prenatal development.
- This idea has led some researchers to hypothesize that a mother's nutritional status may be among the environmental causes of autism that interact with genetic factors to cause the development of autism.
- Indeed, multiple studies have established a strong correlation between diet-related health conditions in the mother and a higher probability of autism in the child.
- For instance, both Type 2 diabetes and gestational diabetes have been associated with a higher risk of autism.
- In addition, if the mother is obese, the risk of autism increases by 21.5% and if the mother is hypertensive, the risk of autism in child rises by 14.3%.

- Based on a review of the latest research work in this field, researchers suggested that these conditions were associated with low[er] intakes of several key micronutrients that may be involved in the etiology of autism: zinc, copper, iron and vitamin B9.
- In combination with genetic risk factors, insufficient intake of these nutrients may contribute to disruptions in fetal brain development that lead to autism.
- It is important to note that pregnant mothers who have one of these food-related health conditions can still take action to reduce the risk of autism for the child by making strategic dietary decisions that target specific micronutrients.

Food-related Issues As a Manifestation Of Autism.

- While discussions of food as a potential cause of autism remains primarily within the research community, some families experience a more concrete connection between food and autism on a daily basis.
- Children with autism are significantly more likely to be “picky” or “selective” eaters.
- According to an estimate, 25% of healthy children are picky eaters while about 80% of children with autism demonstrate selective eating tendencies, often refusing to eat or even try whole categories of food.
- In most serious cases, a child with autism may limit their diet to as few as five foods.

- The impairments experienced by children with ASD can affect nutrient intake and eating behaviors if a child accepts only specific foods, refuses new or unfamiliar foods, or has increased hypersensitivities (to texture, temperature, color, and smell) or difficulty making transitions.
- Children with ASD often refuse fruits and vegetables and may eat only a few foods from the other food groups. Although most children have normal growth parameters, their restricted diets make them at risk for marginal or inadequate nutrient intake.
- Unsurprisingly, studies have shown that selective eating issues in children with autism can lead to deficiencies in important micronutrients especially among children with the most restrictive diets.

- A broad study of over 250 children with autism from 5 different states highlighted insufficient consumption of Vitamin A, Vitamin C, Vitamin D, Zinc, Calcium, Phosphorus, Choline, Fiber and Potassium.
- Although the commonness of inadequate intakes is just as high amongst normally-developing children for some of these nutrients, the effects on children with autism may be **more significant**.
- For instance, evidence suggests that certain nutrients are less readily absorbed by patients with autism. As a result, the problem can escalate from inadequate intake to measureable nutrient deficiency.
- A possible explanation to why certain nutrients are less readily absorbed in patients with autism is the difference in their gut microbiome.
- Bacteria in the gut play a key role in nutrient absorption and studies suggest that the bacterial composition of the gut is different for children with autism.

Food - A Contributor To The Escalation Of Autism

Symptoms.

- Deficiencies in multiple nutrients, including MethylB12, Vitamin D and Folic acid have all been associated with the core symptoms of autism.
- Disruptions in the gut microbiome /unhealthy gut microbiome can lead to gastrointestinal issues like constipation and diarrhea; common symptoms of autism.
- There is also preliminary evidence that consuming certain types of foods may directly exacerbate symptoms of autism.
- For instance, some studies indicate that dietary gluten and casein are not properly digested in the gut of children with autism causing an interference with regular bowel movement and directly affecting brain function.
- Another instance is avoiding simple carbohydrates, artificial flavors and colors for children with ADHD(Attention-Deficit Hyperactivity Disorder)as this can makes symptoms worse.
- Experts say that whatever is good for the brain is likely to be good for ADHD e.g: a diet rich in proteins, complex carbohydrates and omega 3 fatty acids.

- When these children are not getting the nutrients they need from food, another option is to boost micronutrient intake with supplements.
- Taking supplements optimized for bioavailability can be a particularly effective strategy for children who struggle with the sensory processing of a normal, balanced diet.
- Although research is still in its early stages, studies on butyric acid, methyl B12 and folic acid offer preliminary evidence of behavioral improvements in children with autism.
- Clearly, the relationship between autism is complicated and **varies for every child.**

AUTISM AND THE GUT

Multiple reports describe chronic gastrointestinal (GI) dysfunction and symptoms in 9%-84% of children with ASD.

- Constipation
- Diarrhea
- Abdominal bloating, discomfort, irritability
- GI reflux/vomiting

Pathological findings show:

- Inflammation of the GI tract
- Compromised gut microflora

FIX YOUR GUT, FIX YOUR BRAIN!

- The gut microbiota is believed to play a pivotal role in human health and disease management through involvement in physiological homeostasis, immunological development, amino acid metabolism etc. which in a reasonable way explains the role of the gut-brain axis in autism.
- As the pathophysiology is still elusive, it is important to take into account the various symptoms that are concurrent in autism.
- Gastrointestinal problems that are seen associated with most of the autism cases suggests that alleviating these GI problems could help alleviate symptoms and bring out the much needed overall improvement in affected children.

Food Intake/Refusal In ASD

Food intake/Food refusal may be secondary to;

- Sensitivity to food textures
- Sensitivity to taste and/or smell of food
- Food neophobia (fear of new/unfamiliar foods)
- Perseverative behavior (continual involuntary repetition)
- Obsession
- Operant behavior e.g learned aversion.

NUTRITION INTERVENTION THERAPY IN ASD

1. Gut/gastrointestinal problems;
 - Immune (Food sensitivities/allergies)
 - Inflammation (Food sensitivities/allergies)

Eliminate the top eight allergens (milk, eggs, wheat, fish, shellfish, soybeans, peanuts, tree nuts) and **corn, gluten, chocolate, coffee, tea, artificial ingredients** from the diet and **gradually introduce** individually to get specific allergens.

2. Gluten-free, casein-free diet (GFCF)

Gluten(wheat protein)

Casein(milk protein)

3. Supplementation with Essential Fatty Acids (EFAs) and mega vitamins.

Essential fatty acids refer to Omega 3 and Omega 6 fatty acids which are necessary for nerve and brain development.

Natural sources include:

- Fatty fish (salmon, mackerel, sardines)
- Eggs
- Walnuts
- Soybeans
- Corn
- Nuts and seeds
- Meat , poultry.

Megavitamins supplementation includes:

- Vitamin B6 and magnesium (oats, banana, milk, peanuts, poultry, fish)
- Vitamin B12 and folic acid (meat, fish, milk, eggs, broccoli, cabbage, kale, spinach)

ELIMINATING GLUTEN

Here are some gluten sources that should be avoided:

Grains:

- Wheat (all types)
- Barley
- Rye
- Semolina
- Spelt
- Bulgur
- Couscous
- Anything “malt” or “malted”
- Oats not labeled gluten-free
- Any flour from the above sources



Bread, Cereal, Pasta, Snacks

- Wheat bread (whole grain wheat, white bread, rye, barley, pumpernickel)
- Cereal bars
- Tortillas that aren't labeled gluten-free
- Granola and granola bars that are not labeled gluten-free
- Durum or semolina pasta
- Egg noodles
- Wheat crackers
- Any cracker not labeled gluten-free
- Conventional baked goods and pastries

Others

- Soy sauce/tamari
- Gravy mixes, seasonings
- Malt or "malted" grains
- Malt vinegar
- Modified starch
- Certain candies (licorice)

ELIMINATING CASEIN

Here are casein sources that should be avoided:

Milk

- Cow milk
- Goat milk
- Sheep milk
- Other mammal milk

Other Dairy Products

- Yogurt
- Cheese
- Sour cream
- Butter
- Ice cream
- Milk chocolate
- Creams

Other

- Most pastries, like cakes, cupcakes, and cookies
- Crackers and chips with added milk flavoring (goldfish, sour cream chips)
- Dairy-based sauces and dressings



POTENTIAL NUTRITIONAL DEFICIENCIES WITH THE GFCF DIET.

Lack of dairy

- Vitamin D at risk as well as calcium (bone density issues)
- Often a major source of protein.

Lack of grains

- B vitamins and Iron are at risk.

Lack of natural sugars

Vitamin/mineral supplementation may not be appropriate, safe, or sufficient.

HELPING FAMILIES DECIDE BY KNOWING RISKS/DIFFICULTIES.

- Safety of diet; toxicities, potential deficiencies.
- Efficacy of diet (based on facts)
- More costly than a traditional diet.
- Difficult to follow especially if the child eats outside the home (e.g: in school or at grandma's)
- Further isolates child from peers.
- If the child is a “picky eater” or has feeding problems these may be complicating factors when introducing restrictive diets.
- Can lead to nutritional deficiencies: the more restrictive the diet the higher the risk.

IMPROVING THE GFCF DIET

| Concern | Intervention |
|------------------------------|---|
| Fiber intake | Increase fruits and vegetables. Increase nuts, flaxseed meal. |
| Calcium and vitamin D intake | Use fortified non-dairy milk alternatives Increase intake of non-dairy calcium sources e.g. salmon, beans, kale, lentils, chia seed, oranges, broccoli, almonds. |
| Iron/Zinc intake | Increase intake of meats, beans. Fortified foods. |

CONCLUSION

Children with ASD have increased incidences of:

- Chronic gastrointestinal problems.
- Selective eating behaviors.
- In spite of anecdotal reports suggesting that a subgroup of individuals with ASD respond to these restrictive diet intervention, additional data is needed before health professionals can recommend specific modifications.
- Some children might not be able to communicate genuine GI pains/discomfort while others might not experience any.
- There **isn't** a “one size fits all” approach.
- There is an established link between optimal nutritional status and behavioral health.

THANK YOU

