Autism Spectrum Disorders (ASD) and the Impact of Gluten Free, Casein Free (GFCF) Diets

Research Project

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Bottom Line Up Front

- Autism, and ASD together form a diverse range of conditions related to difficulty in sensory processing, communication, behavior, and cognitive function[1]
  - No diagnostic test
  - Considered uncurable
  - Speculative cause: environmental or physiological
- A GFCF diet has been shown to improve behavior[2]
  - Comprehensive double-blind case-controlled studies are limited
  - Unknown reason for the positive effect
  - Empirical evidence is lacking
- Use of GFCF diet requires medical supervision due to nutrient deficits compounded by selective eating[3]

ASD Medical Facts and Theory

- Increasing world-wide prevalence of autism 1 in 100 children[1]
  - Occurs 4x more often in boys
- Top three medical co-morbidities[4]
  - Epilepsy
  - Behavioral/psychiatric
  - Gastrointestinal
- Third Generation Review of ASD Evidence Based Practices[5]
  - Silent on nutritional recommendations (2021)
- Theories of Physiological Cause[2]
  - Systemic: Autoimmune
  - Gastrointestinal: Opioid Excess “Leaky Gut”
  - Neurological

Summary of Technical Research

- Merit of GFCF diet for ASD impacted children
  - [2024] 586 studies 27 met rigorous case controlled, non-bias criteria[2]
  - [2021] 654 studies 6 met case controlled and duration of effect[6]
- Empirical measures not consistently used
  - Diet adherence – urinary measures of gluten
  - Cognitive change – formal testing or MRI
  - Behavior change – inherently difficult to measure
- Merit of vegan diet in children[7,8]
  - [2024] 2481 studies 18 qualified as part of the meta-analysis
  - Crossed with 38 different outcomes
- Bottom line: No linkage between cause, nutritional science, treatment and outcome

Diet Improvement Subjective Scorecard[2]

- 2024 Scoping Review and Meta Analysis [10 years]
  - (Strong Linkage) Behavior improvement
    - (++) Children with chronic gastrointestinal symptoms
    - (+) Sleep depravation, or disordered sleep patterns
  - (Moderate) Communication and interaction improvement
    - (+) Majority of studies showed improvement
    - (-) Small number of randomized controlled trials (RTC)
    - (-) Varying methods of measuring improvement
  - (Low) Cognitive improvement
    - (-) Improvement in 30% of participants
    - (-) Variable methods of measurement
  - (Moderate) ADHD reduction
    - (++) Most measurable reduction was in age group 7–9-year-olds
    - (-) Very small cohort (72) but it was an RTC
- Bottom line: GFCF is potentially an effective intervention

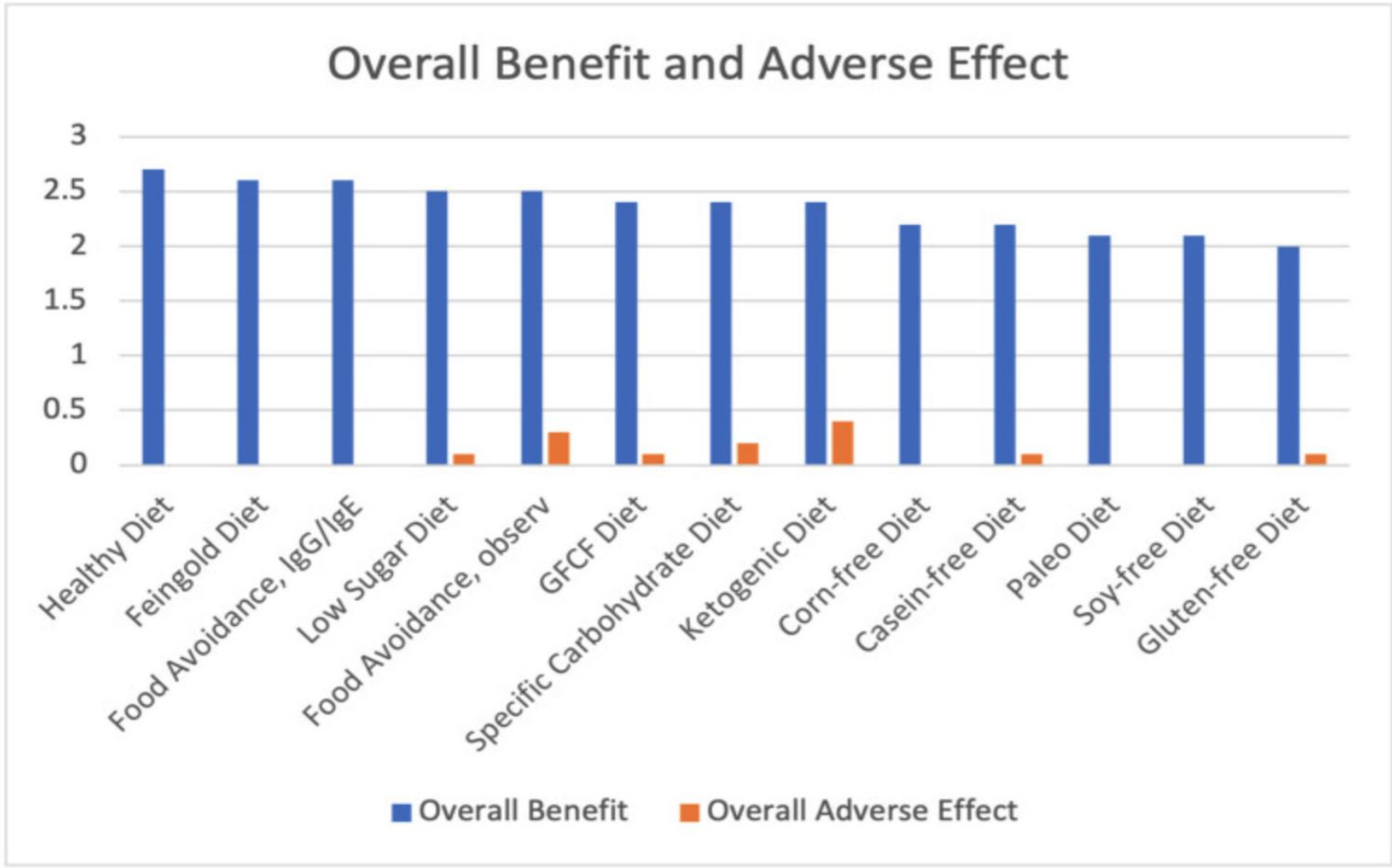
Vegan Diet for ASD Technical Summary

- New pathways of research is needed about Vegan diets for ASD children– linkage of inflammatory response, brain
  - First major systematic literature review and meta-analysis
  - Study was published early online – 2023
  - Points to gaps for ongoing need for research
- What we can apply from studies of vegan children[8]
  - (-) Lower intake of energy
  - (-) Lower intake calcium, vitamin D, vitamin B2, ferritin
  - (-) Lower bone mineral content, higher fracture risk
  - (-) Shorter stature of children compared to controls
  - ( ) No difference vitamin B1, B6, B12, A, beta-carotene
  - (+) Higher intake folate, vitamin C,E, magnesium, potassium, iron
  - (+) Lower HDL/LDL, higher B12 (supplementation)

Food Selectivity Prevalence in ASD[3]

- High prevalence of food selectivity and restriction in children with ASD (% in ASD population vs % in control population)
  - Prefer foods of a certain consistency (68% vs 5%)
  - Choosy about food (79% vs. 16%)
  - Reticent to try new foods (95% vs 47%)
  - Restricts a variety of foods (58% vs 16%)
- Specific selectivity habits
  - Reduced intake of fruits, vegetables, dairy, protein, starch
  - Preference for puree's
- Behavioral Aspects[9]
  - Food refusal, rituals or obsessions
  - Behavior problems related to mealtimes
  - Restricting specific categories of foods (texture, color, temperature)
  - Preferences related to food preparation methods

Impact of Therapeutics Diets on ASD[10,11]



GFCF Diet Informal Standard of Care Recommendations for RDN

- Contradicted
  - Malnourished or at risk within the next 6 months
  - High degree of food selectivity
  - Age 0-3 y.o.
  - Unknown dairy or gluten allergy status
  - Vegan Diet
- Potential benefit[2]
  - Improves chronic GI concerns
  - Reduces ADHD in males aged 7-9 y.o. with Dx. of ADHD
  - General, unmeasurable improvements in behavior and cognition
- Risks[2]
  - Weight Loss
  - Sleep Disturbance
  - Nutrient Deficiency

Nutrient Deficits to Monitor in GFCF Diet for Children

- Critical to monitor Vitamin D status[8]
  - (Strong) Evidence supporting the risk of bone fracture to children on dairy free diets
  - (Uncertain) Risk of bone health
- B Vitamin status[8]
  - GF diet can increase the risk of B-vitamin deficiencies due to eating non-enriched bread products
  - (Strong) Evidence supporting the risk of B2 vitamin deficiency in vegan diet in children– which can be an indicator of risk on GFCF

Conclusion

- Managing the nutrient intake of a child with ASD requires careful oversight
  - Primary goal is to establish appropriate energy intake and avoid malnutrition
  - Maximize nutrient dense foods
- Implementing a GFCF diet may provide benefits
  - Allergies should be ruled out before implementing the diet
  - May cause or exacerbate existing nutrient deficiencies
  - Specialized scenarios where it should be considered
  - Regular diet intake and nutrient assessment is required
- Science is still emerging, there is no formal standard of care, advise families to only use a GFCF diet for children only under medical supervision

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Backup: Research Methods Used for Landmark[2]

- Use of Joanna Briggs Institute JBI method for scoping reviews
- Use of the Systematic Reviews and Meta-analysis for scope Reviews (PRISMA-ScR)
- Literature search: MEDLINE, EBSCOHost, CINAHL, ProQuest
- Formal time-period published research July 2013 – March 2024
- Only peer reviewed publications
- Randomized controlled trials
- Observational studies
- System reviews