NUTRITION AND AUTISM SPECTRUM DISORDERS

Andrea Heyman, MS, RD, LDN

Objectives

• Understand common nutritional concerns in children with ASD
• Discuss complications and deficiencies that result from various nutritional concerns
• Discuss recommendations for improving nutritional status of children with ASD
• Understand general principles of a healthy diet
Common Nutrition Concerns with ASD

- Food selectivity
- Common nutrient deficiencies
- New food anxiety
- Food/fluid refusal
- Overweight
- Underweight
- Obsessive/perseverative interests about food presentation or routine
- Other non nutritional factors

Food Selectivity in Children with ASD

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cornish</td>
<td>1998</td>
<td>70% children with ASD were selective eaters</td>
</tr>
<tr>
<td>Williams et al.</td>
<td>2000</td>
<td>67% of parents complained of food selectivity in their children with ASD</td>
</tr>
<tr>
<td>Schreck and Williams</td>
<td>2006</td>
<td>72% parents reported their children had limited foods</td>
</tr>
<tr>
<td>Schmitt et al.</td>
<td>2008</td>
<td>70% of children with ASD selected food based on texture (11% children without ASD)</td>
</tr>
<tr>
<td>Whiteley et al.</td>
<td>2000</td>
<td>83% parents reported children had restricted number of foods</td>
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Food Selectivity in Children with ASD

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<tr>
<td>Bandini et al. 2010</td>
<td>41% children with ASD rejected food more often than typically developing children (19%)</td>
</tr>
<tr>
<td>Klein and Nowak 1999</td>
<td>53% of patients were unwilling to try new foods</td>
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</table>

Food Selectivity

- Texture
- Color
- Type
- Shape
- Brand
- Container/Packaging
- Temperature
- Visual presentation
Factors Associated with Food Selectivity: Texture

• Ayres describes an overreaction to certain experiences of touch resulting in an observable aversion or negative behavioral response to tactile stimuli.

• Ben-Sasson et al. studied toddlers and found of those with ASD; 89% were under responsive; 75% were over responsive and 67% were both under- and over responsive

Factors Associated with Food Selectivity: Texture (cont.)

• Eating is one of the areas of daily life activities that may be negatively affected by sensory aversions

• Oral defensiveness may be part of a larger problem in modulating sensory input

• Smith et al. found children with tactile defensiveness showed significant differences in eating habits and food choices as compared to children without tactile defensiveness

• Leekam et al. suggest particular sensory inputs can cause behavior problems in individuals with ASD

• Schmitt et al. found boys with ASD based food choices on texture more often than controls
**Concerns with Selective Eating**

- Nutrient deficiency
- Growth retardation
- Obesity
- Poor bone growth

**Treatment for Food Selectivity**

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<tr>
<td>Laud et al.</td>
<td>2009</td>
<td>Feeding behaviors improved in children with ASD participating in an intensive interdisciplinary feeding program.</td>
</tr>
<tr>
<td>Sharp et al.</td>
<td>2011</td>
<td>After admission to an intensive feeding day treatment program, children with ASD showed significant improvements regarding food variety, consumption and appropriate mealtime behavior.</td>
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Nutrition Intervention: Selective Eating

• Multiple introductions of a new food
• Alternative sources of nutrients
• Complete pediatric MVI if needed
• Consider behavioral or feeding intervention if severe selectivity

Common Nutrient Deficiencies

• Lower intake of calcium
• Lower intake of protein
Nutrition Implications: Nutrient Deficiencies

- Suboptimal growth
- Disturbance in mood, emotion and behavior
- Suboptimal function of body functions—immune system, vascular system, metabolic system
- Cognitive function

Expected Childhood Growth

- Proportionality
- Preventing overweight/obesity
- Concerns for under nutrition
Expected Childhood Growth

- Proportionality
  - BMI percentile
  - BMI = \frac{\text{weight (kilograms)}}{\text{height (meters}^2)}
- Plotted on percentile chart
Growth Charts: BMI Percentile

BMI Percentile Categories

<table>
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<tr>
<th>Weight Status Category</th>
<th>Percentile Range</th>
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<td>Underweight</td>
<td>Less than the 5th percentile</td>
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<tr>
<td>Healthy weight</td>
<td>5th percentile to less than the 85th percentile</td>
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<tr>
<td>Overweight</td>
<td>85th to less than the 95th percentile</td>
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<tr>
<td>Obese</td>
<td>Equal to or greater than the 95th percentile</td>
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Interpreting BMI Percentile Results

Factors Related to Over/under Eating

- Hunger vs appetite
- Medications may affect hunger/satiety
  - May need to work on medication management
Risks of Overweight & Obesity

- Chronic medical complications
- Orthopedic complications
- Selective eating

Preventing Overweight & Obesity

- Encourage active play
- Limit screen time
- Eat right
- Stay on course
Risks of Underweight

- Nutrient deficiencies
- Poor growth
- Decreased immunity
- Less effective participation in school/activities/therapy

Preventing Underweight or Under Nutrition

- Continue to provide varied food options
- Use calorie boosters or oral supplements as needed
- Consider vitamin supplementation
Gluten Free Casein Free Diet

• Gluten is a protein occurring in wheat, barley, rye, commercially available oats
  • Initially developed for individuals with Celiac Disease
    • Digestive, autoimmune disorder
    • Symptoms include: bloating, abdominal pain, gas, diarrhea, weight loss, growth problems in children
• Casein is the protein most often found in milk and dairy products
• GFCF diet eliminates these proteins

Prevalence of GFCF Diet in Children with ASD

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<td>2006</td>
<td>66% of parents responding to survey reported using GFCF as alternative treatment</td>
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<td>Wong et al.</td>
<td>2006</td>
<td>30% parents used or had used GFCF diet</td>
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<td>Herndon et al.</td>
<td>2009</td>
<td>In a cross sectional study in Colorado, 31% of children with ASD used a GFCF diet</td>
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<td>Bandini et al.</td>
<td>2010</td>
<td>Based on 3 day food record, GFCF diet was used in 20.7% of children</td>
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<td>Hall et al.</td>
<td>2012</td>
<td>Found 30% used GFCF if a study examining complementary practices</td>
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### Studies Examining GF and or GFCF Diet

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<th>Type of Study</th>
<th>Finding</th>
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<tr>
<td>Millward et al.</td>
<td>2008</td>
<td>Review</td>
<td>Two small RCT were examined, 3 interventions favored the treatment, 3 interventions showed no effect. Efficacy for these diets were poor.</td>
</tr>
<tr>
<td>Buie</td>
<td>2013</td>
<td>Review</td>
<td>One double-blind, crossover study showed no benefit of GF diet, most studies were unblinded, observational studies and observer bias could not be controlled. Insufficient evidence to support GF diet</td>
</tr>
<tr>
<td>Mari-Bauset et al.</td>
<td>2014</td>
<td>Review</td>
<td>The evidence for using the GFCF diet is weak and should only be used after diagnosis of intolerance or allergy.</td>
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Concerns with Following GFCF Diet

- GFCF diet eliminates many grain products including wheat products which are enriched with iron, thiamin, niacin, riboflavin and folic acid
- GF diet may affect gut flora
  - gluten may act as prebiotic and nourish good gut bacteria
  - without gluten the proportion of harmful bacteria can increase
- Foods containing casein are also primary dietary sources of calcium
- What are long term effects of GFCF diet (osteoporosis, decreased bone density)

Most Common GI conditions in ASD

- Chronic constipation
- Abdominal pain, with or without diarrhea
- Encopresis (as a consequence of constipation)
- Others
  - GERD
  - Abdominal bloating
  - Disaccharidase deficiencies
  - Inflammation of the GI tract
## Incidence of GI Symptoms in Patients with ASD

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<td>Molloy &amp; Manning-Courtney 2003</td>
<td>24% of children aged 24-96 months had at least one chronic gastrointestinal symptom</td>
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<tr>
<td>Valicenti-McDermott et al. 2006</td>
<td>70% of children with ASD had a history of GI symptoms compared with 28% of typically developing children</td>
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<tr>
<td>Ibrahim et al. 2009</td>
<td>33.9% (vs. 17.6%) of children with ASD were identified with constipation, no difference in GI symptoms</td>
</tr>
<tr>
<td>Nikolov et al. 2009</td>
<td>22.7% of patients were positive for GI problems, primarily constipation and diarrhea</td>
</tr>
<tr>
<td>Wang et al. 2011</td>
<td>42% of parents reported GI problems in children with ASD compared to 12% of unaffected siblings</td>
</tr>
<tr>
<td>Gorrindo Et al. 2012</td>
<td>Parents reported 85% of children with ASD had GI dysfunction</td>
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## Components of a Healthy Meal

![MyPlate.gov](https://choosemyplate.gov/)

- Fruits
- Grains
- Vegetables
- Protein
- Dairy
### General Principles of a Healthy Diet

- Balance
- Variety
- Moderation
- Changing nutrient needs based on age/developmental stage

### Parent-Child Feeding Relationship

- **Parent’s Role**
  - responsible for what is presented to eat and the manner in which it is presented
- **Child’s Role**
  - responsible for how much and even whether they eat
How to Feed Yourself

- Trust yourself
- Be positive and dependable about feeding yourself
- Have food you enjoy
- Emphasize variety
- Don’t use the terms “being good” or “being bad"
- Stop being phobic about sugar, fat and salt
- Be disciplined but not negative

Meal Planning-Tips

- Gets easier with practice
- Look for sales
- Shop your pantry
- Think seasonal
- Mix things up
- Picture the plate
- Recycle menus
- Be flexible (swap days)
Meal Planning-Benefits

- Eat healthier
- Save money
- Save time
- Make grocery shopping more efficient
- Grocery list helps prevent impulse purchases
- Eliminates last minute stress
- Helps answer ‘what’s for dinner?’