At the Intersection of the Senses: Understanding Food Related Pathologies on the Autism Spectrum

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2018 MAND Conference
March 19, 2018
Overview of the Presentation:

- Introduction to Autism Spectrum Disorder (ASD)
- Nutrition-Related Trends
- Eating Disorders on the Spectrum
  - DSM-5 and Autism
- Change of Behavior and Health
- What Nutrition Professionals Can Contribute
Understanding The Relationship Of Autism, Intellectual and Developmental Disabilities

Developmental Disabilities

- Cerebral Palsy
- Intellectual Disabilities
- Deafness and Vision Impairment
- ASD
- Epilepsy
- Etc.
Introduction to Autism Spectrum Disorder

**Autism Core Symptoms:**

1. Restrictions in social interaction;
2. Verbal and nonverbal communication deficits;
3. Restricted range of interests and behaviors.

**Autism Spectrum Disorder Symptoms:**

1. Deficits in social communication and interaction
2. Restricted and repetitive behavior patterns.
Trends in Autism Spectrum Disorder

1943: 4 in 10,000
2014: 1 in 68

Boys: 1 in 42
Girls: 1 in 189
The Face Of Autism
Most People With Autism Are Adults

“neglected”
“invisible”
“unrecognized”

$3.2 Million to the age of 60
“After these individuals leave school, most of them disappear from national data sets. They “age out” of the education system and its records and may be missing from or unidentifiable on social services rolls.”

5,053 children (2-17 years of age)
Autism Speaks Autism Treatment Network
33.6% overweight; 18% obese
Significantly greater than in the general population;
starts earlier suggesting a different trajectory of weight gain

16 studies published between 1985 and 2015 found that adolescents with ID were respectively 1.54 and 1.80 times more at risk of overweight–obesity and obesity than typically developing adolescents.

<table>
<thead>
<tr>
<th></th>
<th>Overweight</th>
<th>Overweight-Obesity</th>
<th>Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>15%</td>
<td>30%</td>
<td>13%</td>
</tr>
<tr>
<td>Adolescents</td>
<td>18%</td>
<td>33%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Nutrition-Related Trends: Obesity and Children


46,707 individuals (10-17 years of age)
National Survey of Children’s Health 2003

23.4% of children with autism were obese

Fifteen studies encompassing 49,937,078 participants and 1,045,538 individuals with ASD (mean age 2 to 29.4 ± 12.1 years).

Prevalence of obesity was significantly higher in individuals with ASD than in controls, but not overweight.
Nutrition-Related Trends: Obesity And Adults

1,507 adults with ASD (ages 18 to 65+); all clients of Kaiser Permanente / California. Chart review between January 2008 and December 2012.

Obesity found at 33.9% vs 27.0% for the control group.

## Nutrition-Related Trends: Obesity and Adults

<table>
<thead>
<tr>
<th>Reference</th>
<th>Population Studied</th>
<th>Rate of Overweight</th>
<th>Rate of Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henderson et al. 2008</td>
<td>ID n = 100</td>
<td>18%</td>
<td>39%</td>
</tr>
<tr>
<td>Sohler et al. 2009</td>
<td>ID n = 291</td>
<td>27%</td>
<td>43%</td>
</tr>
<tr>
<td>Stancliffe et al. 2011</td>
<td>ID n = 8,911</td>
<td>62.2%</td>
<td>33.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overweight or Obese</td>
<td></td>
</tr>
<tr>
<td>Stedman et al. 2010</td>
<td>ID n = 98</td>
<td>30.6%</td>
<td>51%</td>
</tr>
<tr>
<td>Gravestock 2000 Review</td>
<td>ID</td>
<td></td>
<td>2-35%</td>
</tr>
</tbody>
</table>
Nutrition-Related Trends: Obesity and Adults

1050 individuals (age >50) with ID

Healthy Ageing in Intellectual Disability (HA-ID) study found that prevalence of obesity (measured via BMI) was higher than in the general population with high rates of abdominal obesity.

Nutrition-Related Trends: Obesity and Adults

- Obesity associated with...
  - living independently
  - medication use
  - level of disability
  - physical inactivity
  - gender
Weight Management:

Methodological concerns related to sample size, design and analysis leading to insufficient evidence to support the effectiveness of any particular intervention

Nutrition-Related Trends: T2DM and Children/Adolescents

6,122 adolescent and young adults in the Taiwan National Health Insurance Research Database against 24,488 age- and sex-matched control subjects between 2002 and 2009 and monitored them until the end of 2011. Adolescents and young adults with ASD were more likely to develop type 2 DM during follow-up. In addition, those with ASD using atypical antipsychotics (short- and long-term use) exhibited a high risk.

Nutrition-Related Trends: T2DM and Adults


4.5% to 19.4%
Nutrition-Related Trends: Underdiagnosis and Lack of Screening

980 individuals with ID were assessed. Health Ageing in Intellectual Disabilities Study – Netherlands

In some instances twice as many missed diagnoses when compared to the general population

<table>
<thead>
<tr>
<th>Condition</th>
<th>% Not Previously Diagnosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular risk factors</td>
<td>45-50%</td>
</tr>
<tr>
<td>Metabolic Syndrome</td>
<td>94%</td>
</tr>
<tr>
<td>T2 Diabetes</td>
<td>45%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>50%</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>46%</td>
</tr>
</tbody>
</table>

Nutrition-Related Trends for Adults with ASD

- Rates of Obesity
- Eating disorders
- Nutritional Deficiencies
- Gastrointestinal Problems
- Allergies and the Immune Response
- Polypharmacy

Diagnostic Overshadowing
A range of research has found that children with autism were deficient in:

- Folic Acid
- Niacin
- Vitamin B6
- Vitamin C
- Vitamin D
- Vitamin K
- Iron
- Zinc
- Calcium
- Amino Acids
Nutrition-Related Trends: Intake & Nutritional Deficiencies -- Children

Among 53 children with autism spectrum disorders (ASD) and 58 typically developing children, ages 3 to 11, children with ASD were found to consume significantly more daily servings of sweetened beverages and snack foods and significantly fewer daily servings of fruits and vegetables than typically developing children. Further, children with ASD consume more energy-dense foods than typically developing children.

Nutrition-Related Trend: Intake & Nutritional Deficiencies: Adults

70 subjects (28 male, 42 female; mean age 33.9±11.5 years) with IDD

Study concurred with previous findings that the diet of individuals with ID is high in saturated fat and refined carbohydrates and low in vitamin A, fiber, folate and iron. Likewise this sample did not consume sufficient amounts of fruits and vegetables.

Nutrition-Related Trends: Intake & Nutritional Deficiencies: Adults

Nutritional Deficiencies: Adults

Evidence for deficiencies related to Pica

Iron deficiency

Elevated prevalence of mitochondrial dysfunction in ASD

No validated method for dietary intake assessment for adults

Nutritional deficiencies contribute to epilepsy in both cause and consequence
Nutrition-Related Trends: GI Problems

No specific cause of the GI problems in Autism found and it is not considered diagnostic.

Nutrition-Related Trends: GI Problems

Normative constipation, often with co-occurring diarrhea

- restrictive or limited diets
- No physical activity/sedentary lifestyle
- interaction of factors
- hydration
- polypharmacy
- physical causes
Nutrition-Related Trends: Allergies and the Immune Response

Elevated levels of inflammatory proteins
Asthma 35% more common
Food Related Allergies:
  Dermatological
  Respiratory
  Behavioral

Nutrition-Related Trends: Polypharmacy


Eating Disorders Rates On the Autism Spectrum

Children: 90%

Eating Disorders: Adults with ASD

6-17% of adults on the spectrum have Eating Disorders

Eating Disorders: Adults with ASD

Eating Disorders and ASD

Disordered Eating

- Food Rigidity
- Binge Eating
- Sensory Based
- High Risk
Eating Disorders and ASD
Group 1: Food Rigidity

Avoidant/restrictive food intake disorder (ARFID)


Eating Disorders and ASD
Group 2: Sensory Based

- Specificity in presentation
- Specificity in temperature
- Specificity in color
- Specificity in texture

Eating Disorders and ASD
Group 3: High Risk Challenging Behaviors

Rumination  Pica


## Eating Disorders and ASD

### Group 3: Pica

<table>
<thead>
<tr>
<th>Pica: General Population</th>
<th>Pica: Autism Spectrum Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discriminant</strong></td>
<td><strong>Indiscriminant</strong></td>
</tr>
<tr>
<td>Pregnant women, culturally specific, medical conditions, children, dementia</td>
<td>Increasing Pica with increasing severity of Intellectual Disability</td>
</tr>
<tr>
<td>- Dirt or clay</td>
<td>Dirt, chalk, cigarettes, plastics, foam rubber, string, paper, paper clips, rubber bands, clothes, or cloth, grass, metal, buttons, hair, feces, vomit, rocks, glass, broken light bulbs, insects, paint chips, pencils, trash, toiletries, cleaning products, sewing needles, tar, vinyl or rubber gloves, carpet, foam padding, toilet bowl fresheners, spoiled food, mothballs, plastic tubing, tea bags, keys, crayons, twigs, alkaline batteries, soap, sealed snack bags, wood chips, jewelry, styrofoam, coffee grounds, aftershave lotion, toilet water, and dead animals</td>
</tr>
<tr>
<td>- Starch</td>
<td></td>
</tr>
<tr>
<td>- Ice</td>
<td></td>
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</table>
Eating Disorders and ASD
Group 4: Binge Eating

Adults:
Less Food Selectivity
Rapid Eating → Binge Eating Disorder
Eating Disorders and ASD

Binge Eating Disorder and the DSM-5

Distress regarding this behavior

No compensatory behaviors

Not co-occurring with AN or BN

Many obesity related complications

At least once a week for 3 months

No known cause:
* genetics
* dieting history
* depression
* weight stigma
* sexual or other trauma
* family or relationship problems
* addictions

Most Common Eating Disorder in the United States
Eating Disorders and ASD
Group 4: Binge Eating

#1 Eating more rapidly than is normal.

Eating Whenever Food is Available

Eating Too Much

#4 Feelings of disgust, depression or guilt post-consumption.

Stealing Food
Eating more rapidly than is normal:

Risks of Rapid Eating

- Aspiration
- Social Unacceptable → Social Isolation
- Indigestion
- In failure to reach satiety, weight gain

Study among Japanese College Students found a significant correlation between high body fat ratio and rapid eating and hypothesized a relationship due to insulin resistance.

Change of Behavior

Box 4
Common medical causes of a change in behavior or function

- Constipation
- Dental problems
- Dysphagia
- Esophageal reflux
- Headaches
- Hearing changes
- Hypothyroidism
- Kidney stones
- Seizures
- Side effects of medications
- Trauma
- Urinary obstruction or retention or new incontinence
- Urinary tract infections
- Vision changes

Change of Behavior: The Pain Response

What Happened to Paul? Manifestation of Abnormal Pain Response for Individuals With Autism Spectrum Disorder

Janice Goldschmidt

Abstract
During the progression of a pilot nutrition intervention designed to teach cooking skills to young adults with autism spectrum disorder (ASD), one participant—Paul—fell in the parking lot. Prior to the accident, Paul had been making significant gains in the program and had communicated in a number of ways his enthusiasm. After his accident, which resulted in broken and dislocated bones in his ankle, his demeanor was dramatically altered, program gains were lost, and staff noted the appearance of many new challenging behaviors. This article analyzes Paul’s behavior in reference to the pain response in autism. For some time, it was believed that many individuals with ASD did not experience pain based on anecdotal reports of how individuals responded to injury with seeming indifference. This view has given way of late to a nuanced understanding of how atypical sensory processing and stimulus over-selectivity spill...
How Can Nutrition Professionals Contribute?
The Way Forward:
Active Engagement: The Therapeutic Value of Cooking

Hands-On Nutrition Education (HONE)

Conceptual Framework emphasizing:
-- Autonomy
-- Self-Efficacy
-- Socialization
-- Preference

Emphasis on Choice and Individualization

Treatment Modalities: Environmental Controls

Coming Soon To A Bookstore Near You:

Active Engagement: Developing Authentic Cooking Skills for Adults with IDD

By Janice Goldschmidt
Questions?

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References


