

The Challenges of Eating with Neurodivergent Conditions



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Neurodiversity is the concept that there are natural variations in how individual brains work, particularly regarding processing and pathways.¹ A neurodiverse population includes those who are ‘neurotypical’, whose brain function is considered normal, and those who are ‘neurodivergent’ (ND), who have neurodevelopmental conditions including autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), dyspraxia, dyslexia and dyscalculia.¹ It is common for individuals to be diagnosed with multiple ND conditions, especially given presenting symptoms often overlap between ND conditions, or have co-morbidities including anxiety and eating disorders.^{2,3} Each condition has its own spectrum, so two individuals with the same ND condition may still present differently.

The prevalence of ND conditions in children is increasing due to factors such as a greater awareness of these conditions.⁴ Therefore, it is important to increase our understanding of how these conditions may affect their dietary intake.

Autism spectrum disorder

ASD is a neurodevelopmental condition affecting how individuals communicate and interact with the world. Those with ASD often demonstrate restricted, repetitive behaviour and interests,^{5,6} which can affect their diet. In one study, atypical eating behaviours were observed in 70.4% of children with autism compared to 4.8% of neurotypical children.⁷ Factors such as young age, high ASD severity and poor appetite significantly correlate with atypical eating behaviours.⁸

Sensory preferences

Think of all the senses involved when eating a meal – the smell of the food, its appearance and layout on the plate, the sound produced when cut and chewed, the texture and temperature of the food, and the taste.^{9,10} Children with ASD often have strong sensory preferences and aversions related to food, with hypersensitivity to texture being one of the most common.⁷ It is hypothesised that children with

ASD have sensory processing dysfunction, meaning their ability to register, process and sort sensory information to form appropriate responses is impaired, resulting in over or under-sensitivity to stimuli.¹¹ Strong sensory aversions to certain foods can trigger gagging and heaving.⁹

Children with atypical oral sensory sensitivity usually have greater food neophobia, food fussiness and are more likely to under-eat due to negative emotions, compared to children with ASD who have typical oral sensory sensitivity.¹² Anecdotally, parents report their children can detect when there have been small changes in the ingredients of their favourite foods, even if it is not obvious until the packaging is checked. Children with sensory aversions usually prefer pre-packaged foods, sticking to specific brands or sticking to foods of certain colours or textures (e.g. grain products and chicken nuggets), as these foods are predictable and unlikely to change.⁷ Hyperfixation with certain foods can occur.¹³

Avoidant restrictive food intake disorder

Avoidant restrictive food intake disorder (ARFID) is characterised by an individual avoiding certain foods and/or restricting the quantity of food eaten.¹⁴ It is not associated with a desire to lose weight or to control body image.¹⁴ It is estimated that between 8.2% to 54.8% of the paediatric ARFID population also have ASD.¹⁵ Although children with ASD can present with any ARFID subtype, an ASD diagnosis can be a predictor of the ARFID subtype. Compared to individuals without ASD, those with ASD showed a greater lack of interest in eating and more sensory sensitivities, resulting in those with ASD being diagnosed more often with combined or sensory subtypes of ARFID.¹⁵

Mealtime & atypical behaviours

Mealtimes can be hard for those with ASD, with a study showing behaviour difficulties at mealtimes are more common in those with ASD compared to control groups. Behaviour tends to be more disruptive and positively correlates with sensory issues and food selectivity.^{16, 17} Examples include refusal to come to or sit at the table and throwing food.⁹ Behavioural issues can cause stress and dissatisfactory mealtimes for families and may also influence what the rest of the family eats.¹⁶

Children with ASD often thrive on following routine and have a desire for consistency.^{9, 18} This includes foods laid out on the plate in the same way, not allowing foods to touch and only using specific utensils.^{9, 18} If this is disrupted, it can cause the child significant distress and lead to behavioural issues such as tantrums.¹⁸ These can cause significant caregiver burden and limit the child's opportunity to participate in social occasions.¹⁸

The environment the child eats in can also play a role. Some children find noisy environments overstimulating and too distracting and eat better in quiet spaces,^{10, 19} whereas some will only eat certain foods at one location (e.g. nursery).

Some children present with atypical behaviours, such as pocketing food without swallowing, chewing difficulties and hoarding of food.^{7, 9} In one study, pica was observed in 12% of those with ASD.⁷ Pica is when non-edible items are consumed or put in the mouth, such as soil, stones or cotton wool, for example.¹⁹ Pica can occur for multiple reasons, such as seeking sensory input, relieving anxiety or stress, or relieving pain or discomfort. Not only do these non-food items not provide any nutritional benefit, they can also be hazardous to the child.

Nutritional deficiencies

There is conflicting evidence whether nutritional deficiencies are more frequently observed in children with mealtime behavioural difficulties.^{17, 18} Yet, several studies have found food selectivity is associated with a higher risk for nutrient inadequacies.^{10, 16} Children with ASD are often reported to eat few fruits and vegetables¹¹ and have been observed to have suboptimal dietary intakes of fibre, omega-3 and -6 fatty acids, selenium and calcium, among other nutrients.¹⁸

Constipation, pain & tooth decay

Children with ASD are more likely to have gastrointestinal (GI) issues compared to the general population.¹⁰ GI issues affect around 46-84% of children with ASD¹⁰ and include bloating, diarrhoea and constipation.^{10, 20} Constipation is one of the most common issues and can negatively affect appetite.¹⁹ GI issues can occur due to multiple reasons, including sensory and behavioural, dietary, or medical and biological.

- Sensory & behavioural

Due to differences with sensory processing, children with ASD may interpret GI sensations differently to their neurotypical peers, for example, normal digestive processes being interpreted as discomfort.¹⁰ They may also have difficulty recognising and responding to bodily cues, which can lead to a delay in going to the toilet.¹⁰ Children may avoid using the bathroom if it is overstimulating or out of their rigid routine.¹⁰ Anxiety and stress can also manifest as abdominal pain.¹⁰

- Dietary

Compared to neurotypical children, children with ASD often have inadequate fibre and fluid intakes, which can also contribute towards constipation.¹⁰

- Medical & biological

Children with ASD are more likely to have allergies or sensitisations to food, immune dysfunction or deficiencies in digestive enzymes, such as lactase.¹⁰ Research shows decreased gut microbial diversity and overgrowth of pathogenic bacteria, resulting in dysbiosis of the gut microbiome, is common in ASD. The microbiota can produce and regulate neurotransmitters such as dopamine and serotonin, which have roles in sensory processing, mood and behaviour.¹⁰ Furthermore, children with ASD often have dysautonomia and altered communication via the gut-brain axis, contributing to GI issues.¹⁰

Some children with ASD experience delays in language development and struggle with communication.¹⁰ Therefore, GI discomfort may be shown through behavioural changes, food refusal or irritability whilst eating.¹⁰ If children are unable to voice pain or discomfort, then GI symptoms may continue without resolution, further impacting their oral intake.¹⁰ Chronic abdominal pain may also increase anxiety and inability to regulate emotion, contributing to meltdowns, outbursts and sleep disturbances, all of which can impact on appetite and oral intake.¹⁰ Some individuals with ASD find comfort in overeating when they have abdominal pain.¹⁹

Dental health can also play a huge role in oral intake. In one study, tooth decay, missing teeth and gingivitis presented more often in children with ASD compared to those without.²¹ Some children struggle with brushing their teeth due to sensory aversions or inability to stand still, resulting in poor dental health.^{22, 23} Toothaches and mouth ulcers may put children off from eating.¹⁹

- Obesity

Research suggests children with ASD are at higher risk of obesity than their neurotypical peers.¹³ One reason may be due to restricted dietary preferences, especially when accepted foods are processed, pre-packaged or high in fat or sugar.²⁰

Attention deficit hyperactivity disorder

Contrary to the name, not everyone with ADHD has hyperactive tendencies. Those with ADHD can be diagnosed with one of three types, based on what type of ADHD symptoms present more dominantly in them: hyperactive type, inattentive type or combined type.²⁴ Inattentive symptoms may present as making careless mistakes, losing or misplacing items, and struggling to follow instructions. Hyperactive symptoms may present as fidgeting when sitting, being overly talkative, or appearing to be 'driven by a motor'.²⁵ The type of ADHD, or what diagnostic symptoms they present with, may influence what dietary struggles they face.

Parents of children with ADHD reported that their children struggled with common ADHD related issues, such as time blindness (perception of time) and difficulties with working memory.²⁴ Whilst there is minimal research on how these issues can affect the diets of children with ADHD, one could postulate, due to anecdotal reports from adults with ADHD, these can pose as barriers to achieving a healthy diet. For example, adults report forgetting to eat meals due to time blindness or letting food expire in the fridge as they forgot of its existence. Those with ADHD can struggle with sticking to a routine or organisation,^{3, 24} which can lead to an irregular eating pattern.²⁶ One study found males aged 6-10 years with ADHD were less likely to stick to traditional mealtimes and ate more frequently throughout the day.²⁷ This eating pattern was associated with an increased consumption of sugary drinks and lower consumption of fruits and vegetables.²⁷ Anecdotally, some children with ADHD experience sensory issues with food like children with ASD.

Poor appetite & medications

Treatment options to help manage the symptoms of ADHD include both stimulant (e.g. methylphenidate and lisdexamfetamine) and non-stimulant medication (e.g. atomoxetine). One of the main side effects from stimulant medications is appetite suppression.²⁸ Stimulant medications can also cause headaches, nausea and abdominal pain, which are likely to exacerbate an already poor appetite and contribute towards weight loss.^{29, 30} A systematic review concluded that long-term treatment with methylphenidate can result in a reduction in both height and weight z-scores in children,³¹ whereas a population-based study observed a decrease in body mass index standard deviation score for those who had been treated with methylphenidate for 1 to 3 years.³²

Mood & disordered eating

Childhood ADHD correlates with an increased risk of binge eating, purging, emotional overeating, bulimic symptoms, loss

of control eating and food obsession.^{33, 39} Girls with ADHD are almost 4 times more likely to develop an eating disorder compared to those without ADHD.³⁶ One explanation for this is the strong relationship between emotional dysregulation and eating disorders. Emotional dysregulation is the inability to regulate emotions and is thought to be experienced by 50-75% of children with ADHD.^{3, 33} Negative mood mediates the relationship between both inattentive and hyperactive ADHD symptoms and binge-type and restrictive eating.³⁵ Where ADHD is thought to be due to a deficit with dopamine transfer, individuals may seek a dopamine boost by binge eating^{33, 34} or attempt to ignore negative emotions through finding pleasure in eating.³³

Similar to those with ASD, the ability to interpret bodily signals (interoceptive sensitivity), and the accuracy of these interpretations (interoceptive accuracy), may be impaired in those with ADHD.³⁵ Studies in adults with ADHD suggest that whilst interoceptive sensitivity is not associated with disordered eating, interoceptive accuracy mediates the connection between inattentive ADHD symptoms and binge eating behaviours.^{35, 37} This means that deficits in the awareness and reliance on satiety and hunger cues facilitates the relationship between inattentive ADHD symptoms and binge eating.^{35, 37} Similar results are seen in paediatric studies, where children with ADHD and 'loss of control' eating are more likely to eat due to desire and in the absence of hunger, which may contribute to overeating.³⁸ Those with more inattentive ADHD symptoms may forget to eat if distracted by other activities, leading to overeating later in the day.³⁷ There is a significant association between ADHD and obesity, with binge eating felt to be a mediating factor.^{39, 40} Additionally, impulsive ADHD symptoms consistently show a positive association with bulimic behaviour.³⁷

In conclusion, ND can present differently in each child and the key is to understand how that child's condition affects them to provide individualised, tailored advice.

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