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**Associations between Sensory Issues,
Mealtime Behaviours, and Food and Nutrient Intakes
in Children with Autism Spectrum Disorder**

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Abstract

Background: Sensory issues are defined as dysfunction within the integration of the seven senses within the brain. Dysfunction can lead to issues within higher-level integrative functions such as social participation and planning and praxis, and lead to atypical responses to one's environment. Sensory issues are highly prevalent in children with Autism Spectrum Disorder (ASD) and have been associated with difficult mealtime behaviours. It is not known if sensory issues are associated with food or nutrient intake in ASD children living in New Zealand (NZ). Nutritional deficits during development could have compounding effects on cognition and behaviour in ASD.

Methods: Analysis of baseline data from an ongoing randomised-controlled trial was undertaken. Using a cross-sectional observational study design we investigated associations of sensory issue severity with frequency of difficult mealtime behaviour and food and nutrient intakes of children aged 2.5–8 years with ASD in NZ. The Sensory Processing Measure (SPM), Behavioural Paediatric Feeding Assessment Scale, Dietary Intake for Child's Eating (DICE), and four-day food diaries were used to measure sensory issues, difficult mealtime behaviours, food intake, and nutrient intake, respectively.

Results: Of 113 participants, 90.2% of children had sensory issues, and 41.5% of children had clinical difficult mealtime behaviours. An increase in sensory issue severity corresponded to an increase in frequency of difficult mealtime behaviours ($r=.265$, $p=.007$). Social participation issue severity was inversely associated with the total DICE score ($r=-.305$, $p=.003$). More than 50% of the children did not meet Ministry of Health recommendations for servings of fruit, vegetables, breads and cereals, milk and milk products, or nutrient intakes for calcium. Neither sensory issue severity nor frequency of difficult mealtime behaviours appeared to be associated with food and nutrient intakes.

Conclusion: Sensory issues are highly prevalent in ASD children and sensory issue severity is positively associated with frequency of difficult mealtime behaviours. Intervention is required in a number of children with ASD to ensure food and nutrient intake recommendations are met.

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List of Abbreviations

AI	Average Intake
AMDR	Acceptable Macronutrient Distribution Range
APA	American Psychological Association
ASD	Autism Spectrum Disorder
BAMBI	Brief Autism Mealtime Behavior Inventory
BMI	Body Mass Index
BPFAS	Behavioural Paediatric Feeding Assessment Scale
CEBI	Child's Eating Behaviour Inventory
CFS	Child Frequency Score
CRP	C-Reactive Protein
DICE	Dietary Index for a Child's Eating
DHB	District Health Board
DNZ	Dietitians New Zealand
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
EAR	Estimated Average Requirement
EBQ	Eating Behaviour Questionnaire
FFQ	Food Frequency Questionnaire
Hb	Haemoglobin
ID	Intellectual Disabilities
IOM	Institute of Medicine
MoH	Ministry of Health
NHMRC	National Health and Medical Research Council
NRV's	Nutrient Reference Values for Australia and New Zealand
NZ	New Zealand
PFS	Parent Frequency Score
RDI	Recommended Dietary Intake
RRB	Repetitive and Restrictive Behaviours
SBMD	Sensory-based Motor Disorder
SDD	Sensory Discrimination Disorder
SF	Serum Ferritin

SIPT	Sensory Integration and Praxis Tests
SIT	Sensory Integration Theory
SMD	Sensory Modulation Disorder
SP	Sensory Profile
SPD	Sensory Processing Disorder
SPM	Sensory Processing Measure
SPSS	Statistical Package for the Social Sciences
SSP	Short Sensory Profile
SSRC	Sense and Self-Regulation Checklist
TFS	Total Frequency Score
US	United States
VIDOMA	Vitamin D and Omega-3 in Autism
WHO	World Health Organisation