

Do Probiotics Influence Gastrointestinal Symptoms or Behaviors in the Autistic Pediatric Population?



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Abstract

Autistic Spectrum Disorder (ASD) is a condition with pronounced deficits in social interactions, with exhibited behavioral symptoms including irritability, anxiety, communication, and repetitive behaviors, and hyper-focused interests or activities. In parallel, many autistic individuals experience gastrointestinal challenges such as abdominal pain and reflux, as well as frequent incidence of constipation or diarrhea. Compared to neurotypical children, these ongoing issues can be severe and have been associated with the severity of autism-related symptoms.² Emerging studies have shown that the gut microbiota of autistic children differs from that of neurotypical peers and healthy siblings. These differences may hold the key to understanding the mechanisms by which gut microbes may influence health outcomes involving both local and systemic pathways. With the increased focus on probiotics as a complimentary alternative intervention, increased interest and ease of access warrants further investigation into the current research.

Purpose

Develop an article for the Pediatric Nutrition Practice Group Building Block publication, of the Academy of Nutrition and Dietetics, to be utilized by Registered Dietitians working with families of autistic children interested in understanding the use of probiotics as an intervention for gastrointestinal challenges with their ASD child.

Methods

- Search PubMed database for research articles published between 2020 and 2025.
- Focus on RCT trial designs with use of probiotics in individuals with ASD
 - Include human pediatric subject research articles
 - Exclude animal (mouse) studies
 - Focus on probiotic interventions with outcomes related to gastrointestinal symptoms.

Results

Author/Date	Study Type	Subjects	Strain	Dose and Duration	Key Findings	Assessment Tools
Meguid et al., 2022	Single arm intervention study	40 ASD children ages 2 to 5 yo	Bifidobacterium spp., Lactobacillus spp) mixed with whey powder and cooked yellow vegetables	10g (8.32 CFU/g/d) for 3 months	Significant improvement observed in total CARS score of ASD Children (p=0.05). Abdominal pain and discomfort resolved. Stooling volume decreased and textures improved (soft)	Childhood Autism Rating Scale (CARS) and Questionnaire on Pediatric Gastrointestinal Symptoms Rome III version.
Santocchi et al., 2020	RCT, double-blind	85 ASD children mean age 4.2 yo	De Simone (Visbiome) Streptococcus thermophilus, Bifidobacterium breve, Bifidobacterium longum, Bifidobacterium infantis, Lactobacillus acidophilus, Lactobacillus plantarum, Lactobacillus para-casei, Lactobacillus delbrueckii sbsp. Bulgaricus.	450 billion/d for 6 months	Probiotic treatment with ASD children w/out gastrointestinal symptoms resulted in a mean point reduction of .81 total ADOS CSS and 1.14 in Social-Affect ADOS CSS scores over six months reflecting improvement in both areas.	Autism Diagnostic Observation Schedule-Calibrated Severity Score(ADOS-CSS); Gastrointestinal Severity Index (GSI) Questionnaire
Khanna et al., 2025	RCT, single-blind, placebo-controlled	180 ASD children ages 2 to 9 yo	Saccharomyces boulardii, Bifidobacterium breve, Befidobacterium brevebifidum, Bifidobacterium animalis lactis, Bifidobacterium longum infantis, Lactovacillus reuteri, Lactobacillus rhamanosus, Lactobacillus plantarium, Lactobacillus acidophilus, Lactobacillus casie, Lactobacillus delbrueckii bulgaricus, Streptococcus thermophils	9 billion CFU/d for 3 months	Improved constipation (p=0.003) and diarrhea (p=0.043). Improved stooling, flatulence reduced, improved abdominal discomfort. Overall GSI score improvement= 25.55%. Correlation between improved GI symptoms and improved behavioral outcomes.	Gastrointestinal Severity Index (GSI) Questionnaire
Guidetti et al., 2022	RCT, double-blind placebo-controlled, crossover	61 ASD children ages 2 to 16 yo	Limosilactobacillus fermentum, Ligilactobacillus salivarius, Lactiplantibacillus plantarum, Bifidobacterium longum (DLBL07, DLBL08, DLBL09, DLBL10, DLBL11.	10 billion CFU/d for 10 months (2 cycles for 3 months with 2-month washout period after each cycle)	Diarrhea improved (p=0.05), Receptive Language improved (p=0.03), Abdominal Pain improved (p=0.05), Communication improved (p=0.01), Disadaptive behaviors improved (p=0.05). Parental stress improved: Mother (P=0.03), Father (p=0.04) ,Total Parental Stress (P=0.01)	Vineland Adaptive Behavior Scale-I, Psychoeducational Profile 3 Assessment
Rojo-Marticella et al., 2024	RCT, double-blind placebo-controlled	38 (ADHD), 42 (ASD) Children ages 5 to 16 yo	Lactiplantibacillus plantarum and Levilactobacillus brevis	109 CFU/d for 12 weeks	No statistically significant changes from probiotic intervention in neuropsychological focused assessments in ASD population.	Conners Continuous Performance Test-3, Social Responsiveness Scale-2,Behavior Rating Inventory of Executive Function 2

Conclusions

- Several randomized controlled trials (RCTs) using probiotics reported beneficial effects on gastrointestinal (GI) symptoms, including improved stool consistency and volume, reduced flatulence, and decreased GI discomfort.
- Similarly, some studies report behavioral improvements, potentially attributable to a reduction in gastrointestinal discomfort.
- Although standardized questionnaires were used to assess behavior, reliance on proxy reports may introduce subjectivity.
- Due to the heterogeneity of probiotic strains studied, it is difficult to recommend one specific strain for clinical use, a few strains however show clinical promise.
- Many studies are limited by small sample sizes and short intervention durations, highlighting the need for additional research.

Future Directions

- Ongoing research continues with ~22 active RCT's in progress. Recommendations for RDs:
 - Share peer-reviewed studies showing that certain probiotic strains such as *Lactobacillus* and *Bifidobacterium* may offer GI or behavioral benefits in some children with ASD.
 - Encourage families to consult with their child's care team before starting probiotics.
 - Advise families to select probiotics produced under stringent quality standards (e.g., USP-verified, NSF-certified).
 - Recommend keeping records of the child's diet, probiotic use (strain/dose), and related symptoms or behaviors.
 - Reinforce probiotics are not a once-size-fits-all intervention and approach with caution.

References

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