

**Behavioral, Sensory, and Telehealth OT Interventions for Childhood Toileting Challenges:
A Systematic Review**

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Abstract

Importance: Occupational Therapy Interventions can play an important role in toileting dysfunction in young children.

Objective: To identify, evaluate, and synthesize the current literature concerning toileting routines in young children with toileting dysfunction to determine the efficacy of toileting routines using occupational therapy interventions.

Data Sources: A literature search occurred between May, 2026 and May, 2026. Follow up searches were conducted on May, 26th, 2026. Databases included search for relevant literature was completed using electronic databases: CINAHL, Academic Search Complete, PsycINFO using Hawai'i Pacific University's online library databases. Search terms included toileting, toilet training, toileting dysfunction, occupational therapy, autism spectrum disorder, sensory processing disorder, social stories, telehealth, sensory integration, caregiver training, activities of daily living, and children as well as combinations of these terms.

Study Selection and Data Collection: This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Published studies on toileting routines were included in the systematic review. Systematic reviews, scoping reviews, dissertations, conference proceedings, editorials, opinion papers, and studies not directly addressing toileting outcomes in children were excluded.

Findings: Two studies included Level III studies and three were Level IV studies according to the American Occupational Therapy Association's Levels of Evidence. The outcomes of these studies indicate telehealth and sensory-based and behavioral interventions may lead to positive toileting outcomes.

Conclusion and Relevance: Occupational therapy can play a unique role in these skills involving toileting and specifically, telehealth and sensory-based and behavioral interventions were effective modalities for delivering interventions. Further research is implicated for larger study designs and toileting interventions among different conditions.

Keywords: Activities of daily living, autism spectrum disorder, caregiver training, child, children, occupational therapy, sensory integration, sensory processing disorder, social stories, telehealth, toileting, toileting dysfunction, toilet training, interventions, young children

Behavioral, Sensory, and Telehealth OT Interventions for Childhood Toileting Challenges: A Systematic Review

Self-care skills are fundamental to daily functioning, including the practical skill of toileting (Cicero, 2002). While many individuals may not consider toileting after achieving independence, a significant subset of the population experiences toileting dysfunction, which disrupts daily activities. Individuals with autism spectrum disorder (ASD), sensory processing disorders (SPD), or both, often encounter these challenges early in life, highlighting the need for targeted interventions.

Occupational therapy plays a distinct role in addressing toileting dysfunction through approaches such as sensory integration (Koshy, 2018) and telehealth interventions (Dabney, 2023). Interventions may include Ayres Sensory Integration (Beaudry-Bellefeuille, 2019) and social stories (Nithiya, 2021). Evidence from these interventions indicates positive outcomes, supporting the use of occupational therapy for young children experiencing toileting challenges.

Given the reported benefits of occupational therapy interventions for toileting outcomes, a review of the current literature was warranted. This systematic review focused on specific interventions, compiling and synthesizing key outcomes and relevant information. The review specifically examined ASD and sensory processing disorder (SPD) to determine which occupational therapy interventions improve participation in toileting routines among young children with toileting dysfunction.

Method

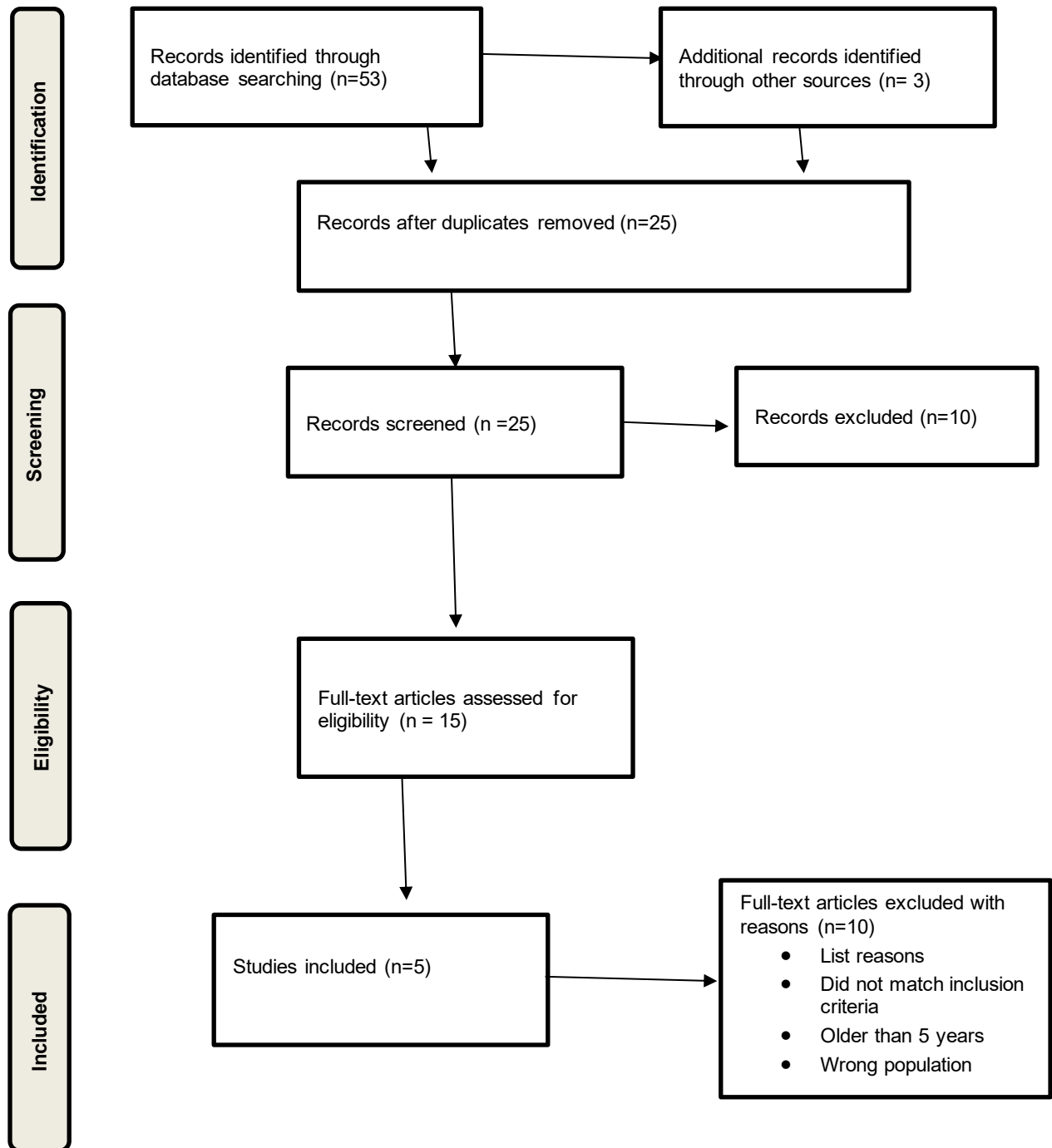
The systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and incorporated recommended processes for conducting a systematic

review. The guiding research question for this systematic review was: Which evidence-based occupational therapy interventions improve participation in toileting routines in young children with toileting dysfunction?

A comprehensive literature search was conducted between May 15, 2026 and May 22, 2026, with an additional search on May 26, 2026 to ensure inclusion of all relevant research. Inclusion criteria required studies to be peer-reviewed, published in English, and dated between 2018 and 2026. Exclusion criteria included systematic reviews, scoping reviews, dissertations, conference proceedings, editorials, opinion papers, and studies not directly addressing toileting outcomes in children. Studies focusing solely on medical management without a rehabilitation or occupational therapy component were also excluded. Electronic database searches were conducted through Hawai'i Pacific University's online library using CINAHL, Academic Search Complete, and PsycINFO. Additionally, a direct search of the *American Journal of Occupational Therapy* occurred. Search terms included toileting, toilet training, toileting dysfunction, occupational therapy, autism spectrum disorder, sensory processing disorder, social stories, telehealth, sensory integration, caregiver training, activities of daily living, and children, as well as combinations of these terms using Boolean operators (AND, OR). Appendix A provides the search terms used for this systematic review. The initial search yielded 53 articles (Figure 1). Four independent reviewers screened and selected studies, assessed quality, and extracted data.

Figure 1

PRISMA Flow Diagram



Results

Five studies met the inclusion criteria and were included in this systematic review. The studies represented Level III and Level IV evidence and were grouped into two major intervention categories: (1) telehealth and parent-coaching interventions and (2) sensory-based and behavioral interventions. An evidence table is provided in Appendix B, and risk-of-bias assessments are presented in Appendix C.

Telehealth Parent-coaching Interventions

Two of the five studies examined the efficacy of telehealth parent-coaching interventions. One study was classified as Level III evidence and the other as Level IV (see Appendix B). Both studies reported positive outcomes and potential benefits associated with telehealth parent-coaching interventions.

Dabney et al. (2023) included three caregiver-participant dyads to evaluate the effectiveness of telehealth interventions for children with ASD. The dyads met virtually using a secure Zoom platform to implement a structured toileting training protocol. Caregivers followed specific guidelines, including sit schedules, designated undergarments, and documentation procedures. The study found evidence supporting telehealth interventions as a successful approach for toileting training. Participants rated the intervention as highly acceptable, with strong satisfaction reported for both the telehealth format and occupational therapy-based coaching. Caregivers particularly valued the individual live coaching sessions and therapist check-ins, while asynchronous educational materials were accessed less frequently. Additionally, families who completed coaching showed greater improvements in toileting skills than those who did not

complete the full intervention, suggesting that consistent participation in the coaching process contributed to improved outcomes.

These studies suggest that interventions such as caregiver coaching delivered via telehealth may improve toileting participation, increase access to services, and enhance caregiver satisfaction. Across the studies on telehealth parent-coaching and related toileting interventions, several consistent limitations were identified. Overall, studies were limited by small sample sizes and restricted participant groups, often involving convenience samples or caregiver dyads, which reduces generalizability and increased the risk of sampling bias (Dabney et al., 2023; Little et al, 2023). Many studies also relied on quasi-experimental or pretest–posttest designs without control groups or randomization, limiting internal validity and the ability to establish causal relationships between the intervention and observed improvements (Little et al, 2023; Nithiya et al., 2021). A common methodological concern was heavy reliance on caregiver-report outcome measures, which may introduce response or reporting bias, particularly in studies involving parent-implemented interventions (Dabney et al., 2023; Little et al, 2023). Several studies also reported attrition or incomplete participation, with caregiver burden and competing life responsibilities (e.g., workload, additional caregiving demands) contributing to drop-out and reduced intervention fidelity (Dabney et al., 2023; Little et al 2023). Additional limitations included heterogeneous baseline skill levels among child participants, limiting comparability of outcomes across participants (Little et al 2023; Nithiya et al., 2021), and short intervention durations without long-term follow-up, making it unclear whether gains in toileting skills were maintained over time (Nithiya et al., 2021; Little et al. 2023). Finally, some studies reported limited engagement with asynchronous or supplemental materials and insufficient detail regarding comparison or control interventions, which reduced replicability and made it difficult to

determine the active components driving intervention effectiveness (Little et al., 2023; Dabney et al., 2023).

Sensory-based and Behavioral Interventions

Three of the five studies on the topic discussed the efficacy of sensory-based and behavioral interventions. One of these studies was a Level III study, and two were Level IV studies (see Appendix B). All studies provided evidence that sensory-based and behavioral interventions are effective and potentially beneficial.

Koshy et al. (2018) reviewed the prevalence of toileting challenges among children with sensory processing disorder (SPD). The effectiveness of sensory integration (SI) therapy was examined for improving toileting skills. The study found that 68.75% of children with SPD experienced toileting difficulties. Children who received sensory integration therapy had greater outcomes than those who did not. Overall areas of improvement were sensory processing, toileting behaviors, and successful toileting. The authors concluded that sensory challenges contributed to toileting difficulties and that Sensory Integration Therapy supported participation in daily occupations and improved toileting outcomes.

Beaudry-Bellefeuille et al. (2019) aimed to improve toileting skills in children by using the Toileting Habit Profile Questionnaire (THPQ), a tool designed to identify atypical defecation habits in children that may be linked to sensory processing issues. Childhood functional defecation disorders (FDD), like functional constipation, are a widespread public health problem, yet current treatments often have limited success because the underlying sensory mechanisms such as over-reactivity to smells or sounds are frequently overlooked

Nithiya et al. (2021) demonstrated that the experimental group, which received social story intervention in addition to conventional occupational therapy, showed statistically significant improvements in both toileting skills and overall functional independence. The control group, which received conventional occupational therapy alone, showed some improvement; however, the gains were smaller than those observed in the experimental group. Comparison of posttest outcomes revealed that the experimental group performed significantly better than the control group, suggesting that the addition of social stories was effective in enhancing toileting independence and functional participation among children with autism.

These studies suggest that sensory-based and behavioral interventions may improve toileting participation, functional independence, and overall toileting outcomes for children experiencing sensory processing differences and autism. Limitations across the three studies (Beaudry-Bellefeuille et al., 2019; Koshy et al., 2018; Nithiya et al., 2021), were identified that weaken the overall strength and generalizability of the evidence base. A primary concern was the use of small, convenience-based and/or homogeneous samples, often with limited cultural and demographic diversity, which restricts external validity and limits applicability to broader pediatric populations (Beaudry-Bellefeuille et al. (2019); Koshy et al., 2018; Nithiya et al., 2021). Methodologically, studies were also limited by weak experimental designs, including lack of randomization and absence of control or comparison groups in some cases, reducing internal validity and making it difficult to attribute outcomes directly to the interventions (Koshy et al., 2018; Nithiya et al., 2021). In addition, reliance on caregiver-reported measures and incomplete behavioral or contextual reporting (e.g., toileting routines, sensory factors, or intervention fidelity) introduced potential reporting bias and reduced measurement precision (Beaudry-Bellefeuille et al., 2019; Koshy et al., 2018). Several studies also demonstrated limited

participant stratification and narrow inclusion criteria, such as restricted age ranges or diagnosis-specific samples, further limiting generalizability and subgroup analysis (Beaudry-Bellefeuille et al., 2019; Nithiya et al., 2021). Finally, across studies there was a lack of long-term follow-up data, preventing conclusions about the durability of toileting gains over time, and in some cases limited clarity regarding intervention standardization or measurement refinement (e.g., ongoing validation needs for assessment tools), which impacts replicability and clinical translation (Beaudry-Bellefeuille et al., 2019; Nithiya et al., 2021). Overall, these shared limitations highlight the need for larger, more diverse, methodologically rigorous studies with stronger controls and longitudinal outcome tracking to strengthen the occupational therapy evidence base for toileting interventions.

Discussion

This systematic review examined occupational therapy interventions designed to improve participation in toileting routines among young children with toileting dysfunction. Across all five studies, evidence consistently supported the use of telehealth, caregiver coaching, sensory-based interventions, and behavioral supports to improve toileting outcomes. Although the evidence base remains limited, the findings suggest that occupational therapy interventions may positively influence toileting participation, caregiver satisfaction, and child independence.

The strongest area of agreement across studies was the importance of caregiver involvement. Both telehealth studies demonstrated that caregivers who received coaching and implemented structured toileting routines reported improvements in toileting participation (Dabney et al., 2023; Little et al., 2023). These findings support family-centered occupational therapy practice

and suggest that caregiver coaching may be an essential component of successful toileting interventions.

Another consistent finding was the relationship between sensory processing differences and toileting challenges. Koshy et al. (2018) and Beaudry-Bellefeuille et al. (2019) identified sensory over-responsivity, sensory avoidance, and sensory processing differences as factors contributing to toileting difficulties. Interventions that addressed sensory needs, including sensory integration therapy and sensory-informed assessment, were associated with improved outcomes.

Social stories emerged as an additional intervention strategy with promising results. Nithiya et al. (2021) found that combining social stories with conventional occupational therapy produced greater improvements than occupational therapy alone. This finding suggests that structured visual supports may enhance learning and participation among children with ASD.

Despite generally positive findings, the evidence base demonstrated several important limitations. Most studies included small sample sizes, convenience sampling, and limited participant diversity. Additionally, several studies lacked randomization, control groups, or long-term follow-up, reducing confidence in the ability to attribute outcomes solely to the intervention. These methodological limitations suggest that current evidence should be interpreted cautiously.

Future research should focus on larger randomized controlled trials, greater demographic diversity, and longitudinal follow-up to determine whether toileting gains are maintained over time. Additional research is also needed to examine which intervention components contribute most significantly to successful toileting outcomes and to evaluate intervention effectiveness across diagnostic populations.

Strengths and Limitations

The strengths of this systematic review included consistency with the PRISMA guidelines for conducting searches and refining the results. There was also consultation with qualified researchers experienced in conducting systematic reviews, and the use of well-described definitions for toileting and sensory processing.

The primary limitation of this systematic review was the limited number of articles specifically addressing sensory processing and functional toileting. Although a systematic search was conducted, some relevant articles from specialized sources may have been missed. The thematic grouping of articles, such as sensory-based and behavioral interventions, required interpretation of each study's primary focus. Additional constraints included small, homogeneous, or English-speaking samples, which restricts generalizability to more diverse populations. The absence of validated measures further limited the ability to assess all sensory-based toileting challenges.

Implications for Occupational Therapy Practice

Occupational therapy practitioners are uniquely positioned to address bowel management by integrating sensory-based approaches with standard behavioral interventions. The Toileting Habit Profile Questionnaire-Revised (Isabelle Beaudry-Bellefeuille et al., 2019) serves as a vital tool for identifying specific sensory over-reactivity triggers such as exaggerated disgust at smells or fear of the toilet flushing that lead to habits like hiding or withholding. Beyond assessment, interventions such as Ayres Sensory Integration (ASI) (Koshy et al. 2018) have demonstrated efficacy in treating retentive fecal incontinence by focusing on the child's underlying sensory needs rather than just behavioral symptoms. For specialized populations like children with autism, the use of social stories (Nithiya et al., 2021) can help reduce anxiety and build the

necessary social-cognitive routines for successful toileting, while telehealth-delivered models (Dabney et al., 2023; Little et al. 2023) offer a great way to implement these interventions in a home environment. By using both the physical and sensory barriers associated with disorders, occupational therapists can provide a comprehensive, non-invasive treatment plan that improves independence in this essential activity of daily living.

Key Takeaways:

1. **Prioritize caregiver coaching and family involvement.** Studies consistently demonstrated that caregiver participation and structured home routines were associated with improved toileting outcomes.
2. **Assess sensory factors contributing to toileting difficulties.** Occupational therapists should use sensory-informed assessments, such as the THPQ-R, to identify sensory barriers affecting toileting participation.
3. **Incorporate sensory-based interventions when appropriate.** Sensory integration approaches may improve toileting performance for children experiencing sensory processing differences.
4. **Utilize social stories and visual supports.** Structured visual supports may improve understanding, reduce anxiety, and enhance independence in toileting routines for children with ASD.
5. **Consider telehealth as a viable service delivery model.** Telehealth-based coaching provides access to occupational therapy services within the child's natural environment and may improve caregiver implementation and treatment carryover.

Conclusion

Comparison of the studies included in this systematic review indicates that telehealth, sensory-based, and behavioral interventions are associated with improved outcomes for children experiencing toileting dysfunction, particularly those with ASD and SPD. These interventions contributed to the development of toileting skills and enhanced self-care capacity in young children. Occupational therapy plays a distinct role in facilitating these skills, with telehealth and sensory-based and behavioral interventions serving as effective modalities. Further research with larger study designs and exploration of toileting interventions across diverse conditions is recommended.

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Appendix A

Systematic Review Search Terms

Occupational therapy or occupational therapist or occupational therapists or ot

AND

Toileting or toileting dysfunction or ADLS

AND

Children or sensory processing or Autism

AND

Interventions or toileting interventions

Appendix B

Evidence Table for Toileting Dysfunction

Author/Year	Level of Evidence Study Design Risk of Bias	Participants Inclusion Criteria Study Setting	Intervention and Control Groups	Outcome Measures	Results
Beaudry-Bellefeuille et al.,(2019)	Level IV Psychometric validation study using Rasch analysis and content analysis. two phases of validity testing. Moderate risk of bias due to small, homogeneous sample and reliance on caregiver report.	Phase 1: Parents of children with functional constipation (FC) (n=16) and typically developing children (n=27). Phase 2: Parents of children aged 3–6 years with FC (n=55) and children with FC and autism (n=21).	No intervention/control treatment groups. Study focused on validation and revision of the Toileting Habit Profile Questionnaire-Revised (THPQ-R).	THPQ and THPQ-R caregiver questionnaires; Rasch analysis; item fit statistics; principal components analysis (PCA); differential item functioning (DIF); person separation index; reliability statistics	Findings supported validity of the revised 15-item THPQ-R for identifying challenging defecation behaviors associated with sensory over-reactivity. Two items related to sensory under-reactivity/perception appeared to measure a separate construct and were recommended for clinical observation only, not scoring. THPQ-R demonstrated acceptable reliability and improved construct validity compared to the original THPQ.

Dabney et al. (2023)	Level IV Qualitative Study Prequestionnaire, post questionnaire Risk of Bias Low due to small sample size and parent reporting.	Participants: N=6 total participants. 3= Caregiver/child dyads. -Children over the age of two -Children with ASD Conducted within the child's home with the guidance of the caregiver	Intervention: Initial: Telehealth pre coaching session with researchers. During: Caregivers implement toileting strategies according to researcher guidelines (Toilet training practices, sit training and fluid loading) and findings documented on online system. Conclusion: Follow-up Telehealth meeting to discuss.	Outcomes measured: Toilet training practices were measured, and caregiver feedback was recorded with the success being measured through toileting successes.	Significant improvement in toileting skills of participants as per the caregiver reporting on the electronic reporting system that was provided by researchers.
Little et al. (2023)	Level III Pilot intervention study using a pretest–posttest design (quasi- experimental feasibility study)	34 families of children with autism ages 2–8 years; English- speaking families.	Intervention: Hybrid telehealth toilet-training program consisting of 5 synchronous occupational therapy coaching sessions over 10–12	Toileting Behavior Questionnaire (TBQ); Goal Attainment Scaling (GAS); Canadian Occupational Performance Measure (COPM);	Parents rated telehealth and OBC intervention as highly acceptable. Significant improvements noted in child toileting skills and parent

	Moderate risk of bias due to lack of control group, small sample size, parent-report measures, attrition, and convenience sampling.		weeks plus asynchronous educational podcasts and tip sheets. Intervention based on Occupation-Based Coaching (OBC). Control: No true control group. Exploratory comparison between completers and non-completers.	Telehealth Acceptability Questionnaire; Social Responsiveness Scale-2 (SRS-2)	satisfaction ($p < .01$). Medium effect size for TBQ ($d = 0.49$); large effect sizes for GAS ($d = 2.39$), COPM parent satisfaction ($d = 1.07$), and COPM child performance ($d = 0.82$). Families who completed all sessions showed greater improvements than non-completers. Asynchronous materials were accessed at low rates, with sensory processing and communication podcasts used most frequently.
Koshy et al. (2018)	Level III Pretest–post-test experimental intervention study Moderate risk of bias due to small sample size and nonrandom	Phase 1 included 96 children with SPD ages 3–10 years. Phase 2 included 22 children with SPD and toilet skill problems. Children ages 3–10 years with autism, ADHD, learning	The experimental group received Sensory Integration Therapy (SIT) plus conventional OT and diet modification education for 4 months, twice weekly for 45 minutes. Control	Sensory Profile (SP); Canadian Occupational Performance Measure (COPM); modified toileting/diet schedule chart	68.75% of children with SPD had toilet skill problems. The experimental group showed greater improvement in toileting performance and satisfaction scores compared to the control group. SIT improved

	participant selection.	disabilities, Fragile X syndrome, emotional problems, and SPD. Phase 2 included children with poor toileting skills and sensory processing differences on the Sensory Profile. Conducted in and around Coimbatore, India.	group received Behavior Modification Therapy (BMT), conventional OT, and diet modification education		sensory processing issues and toileting skills more effectively than BMT alone.
Nithiya et al. (2021)	Level IV Single-subject experimental design (behavioral intervention study) Low risk of bias	N=30 total participants. Control Group= 15 (Location: Kiddos Rehab Center, Porur) Experimental Group= 15 subjects (Location: Sherin's Rainbow Occupational Therapy and Rehab Center, Poonamallee).	Control Group received conventional occupational therapy for the same 12 week duration. They did not receive or see social stories. Experimental Group received 45 minute sessions 2-3x per week for a duration of 12 weeks.	Outcome Measures: self-care skills were assessed by using WEEFIM (pediatric functional independence measure)	Significant difference in pre/post test scores with control group and experimental group.
<i>Note.</i> WeeFIM - Functional Independence Measure for Children					

Appendix C

Risk-of-Bias Table

	Selection Bias (Risk of bias arising from randomization process)			Performance Bias (effect of assignment to intervention)		Detection Bias		Attrition Bias	Reporting Bias	Overall risk-of-bias (low, moderate, high)
Citation	Random Sequence Generation	Allocation Concealment (until participants enrolled and assigned)	Baseline difference between intervention groups	Blinding of Participants During the Trial	Blinding of Study Personnel During the Trial	Blinding of Outcome Assessment: Self-reported outcomes	Blinding of Outcome Assessment: Objective Outcomes (assessors aware of intervention received?)	Incomplete Outcome Data (data for all or nearly all participants)	Selective Reporting (results being reported selected on basis of the results?)	
Koshy et al., (2018)	-	-	?	-	-	?	?	+	+	Moderate
Nithiya, S, et., al (2021)	+	?	+	-	+	+	+	+	?	Low

Note. Categories for risk of bias are as follows: Low risk of bias (+), unclear risk of bias (?), high risk of bias (–). Scoring for overall risk of bias assessment is as follows: 0–3 minuses, low risk of bias (L); 4–6 minuses, moderate risk of bias (M); 7–9 minuses, high risk of bias (H).

Citation. Table format adapted from Higgins, J. P. T., Sterne, J. A. C., Savović, J., Page, M. J., Hróbjartsson, A., Boutron, I., . . . Eldridge, S. (2016). A revised tool for assessing risk of bias in randomized trials. *Cochrane Database of Systematic Reviews* 2016, Issue 10 (Suppl. 1), 29–31. <https://doi.org/10.1002/14651858.CD201601>

Risk of Bias for Before-After (Pre-Post) Studies with No Control Group (One Group Design)												
Citation	Study question or objective clear	Eligibility or selection criteria clearly described	Participants representative of real-world patients	All eligible participants enrolled	Sample size appropriate for confidence in findings	Intervention clearly described and delivered consistently	Outcome measures pre-specified, defined, valid/reliable, and assessed consistently	Assessors blinded to participant exposure to intervention	Loss to follow-up after baseline 20% or less	Statistical methods examine changes in outcome measures from before to after intervention	Outcome measures were collected multiple times before and after intervention	Overall risk of bias assessment (low, moderate, high risk)
Dabney, H. A., et al (2023)	Y	Y	Y	Y	Y	Y	Y	N	NR	Y	Y	Low
Isabelle Beaudry-Bellefeuille et al., (2019)	Y	Y	Y	N/A	Y	N/A	Y	N/A	Y	N	N	Moderate
Koshy et al., (2018)	Y	Y	Y	N	N	Y	Y	NR	Y	Y	N	Moderate

