

## The Effectiveness of Intervention Methods for Repetitive Behaviors in Preschool Children with Autism Spectrum Disorder: A Systematic Review

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**Abstract :** Early intervention is recommended for children with autism spectrum disorder (ASD), and an increasing number of children have received support and intervention before school age in recent years. In this study, we systematically reviewed preschool interventions focused on repetitive behaviors observed in children with ASD, which are often observed at younger ages. Inclusion criteria were as follows : (1) Child of preschool status (age  $\leq 7$  years) with a diagnosis of ASD (including autism, Asperger's, and pervasive developmental disorder) or a parent (caregiver) with a preschool child with ASD, (2) Physician-confirmed diagnosis of ASD (autism, Asperger's, and pervasive developmental disorder), (3) Interventional studies for repetitive behaviors, (4) Original articles published within the past 10 years (2012 or later), (5) Written in English and Japanese. Exclusion criteria were as follows: (1) Systematic reviews or meta-analyses, (2) Conference reports or books. We carefully scrutinized databases to remove duplicate references and used a two-step screening process to select papers. The primary screening included close scrutiny of titles and abstracts to exclude articles that did not meet the eligibility criteria. During the secondary screening, we carefully read the complete text to assess eligibility, which was double-checked by six members at the laboratory. Disagreements were resolved through consensus-based discussion. Our search yielded 304 papers, of which nine were included in the study. The level of evidence was as follows: three randomized controlled trials (level 2), four pre-post studies (level 4b), and two case reports (level 5). Seven articles selected for this study described the effectiveness of interventions. Interventions for repetitive behaviors in preschool children with ASD were categorized as five interventions that directly involved the child and four educational programs for caregivers and parents. Studies that directly intervened with children used early intensive intervention based on applied behavior analysis (Early Start Denver Model, Early Intensive Behavioral Intervention, and the Picture Exchange Communication System) and individualized education based on sensory integration. Educational interventions for caregivers included two methods; (a) education regarding combined methods and practices of applied behavior analysis in addition to classification and coping methods for repetitive behaviors, and (b) education regarding evaluation methods and practices based on children's developmental milestones in play. With regard to the neurophysiological basis of repetitive behaviors, environmental factors are implicated as possible contributors. We assumed that applied behavior analysis was shown to be effective in reducing repetitive behaviors because analysis focused on the interaction between the individual and the environment. Additionally, with regard to educational interventions for caregivers, the intervention was shown to promote behavioral change in children based on the caregivers' understanding of the classification of repetitive behaviors and the children's developmental milestones in play and adjustment of the person-environment context led to a reduction in repetitive behaviors.

**Keywords :** autism spectrum disorder, early intervention, repetitive behaviors, systematic review

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