



Impact of Physical Activity on Inhibitory Control in Children with Autism: A Systematic Review and Meta-Analysis

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ABSTRACT

Introduction: Recent research indicates that approximately 1 in 36 children are affected by autism spectrum disorder (ASD), a neurodevelopmental condition that impacts social and behavioral domains. Additionally, cognitive deficits, particularly in executive functions, have been frequently observed, with inhibition recognized as a fundamental process within all executive functions. As a growing body of research highlights the cognitive benefits of physical activity on typical development children, researchers are increasingly interested in exploring these cognitive benefits for children with ASD. This study aimed to evaluate the effectiveness of physical activity in enhancing inhibitory control in children with autism.

Search strategy: Based on Cochrane systematic review principles and PRISMA guidelines, a comprehensive search was conducted using keywords such as "physical activity", "Exercise", "Autism", and "physical exercises" across multiple databases such as PubMed, Scopus, Web of Science, and Cochrane CENTRAL without any time limitations. Google Scholar was utilized to review grey literature. The inclusion criteria involved randomized controlled trials (RCTs) and quasi-experimental studies examining the impact of physical activity on cognition in children with ASD. Review and observational studies, commentaries, and letters to editors were excluded. Screening and data extraction were independently carried out by two authors, with any discrepancies being resolved through consensus with a third author. The Cochrane Risk of Bias Assessment (ROB-2) tool evaluated study biases. The final data were presented in a results table, and the heterogeneity of the studies was assessed using I^2 statistics. A random-effects model of standardized mean difference (SMD) was applied for statistical analysis. All statistical analyses were conducted using STATA version 14.2.

Results: From a total of 90 studies (duplicates = 43), the final analysis included eight studies (RCTs = 7; quasi-experimental study = 1) with 175 ASD patients in the intervention group and 126 ASD patients in the control group. Studies showed that physical activities could improve the cognitive function in ASD patients. Results of the meta-analysis indicated that inhibitory control was improved significantly in ASD patients with physical activity compared to the control group ($SMD = 0.81$; 95% CI = 0.48 and 1.15; $p = 0.02$; $I^2 = 55.9\%$).

Conclusion and Discussion: This study suggests that physical exercises can enhance inhibitory control in children with ASD. These findings provide insights into improving this population's cognitive outcomes, mainly inhibitory control.

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