Effect of an Ecological Executive Skill Training Program for School-aged Children with Attention Deficit Hyperactivity Disorder: A Randomized Controlled Clinical Trial

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Abstract

Background: As medication does not normalize outcomes of children with attention deficit hyperactivity disorder (ADHD), especially in real-life functioning, nonpharmacological methods are important to target this field. This randomized controlled clinical trial was designed to evaluate the effects of a comprehensive executive skill training program for school-aged children with ADHD in a relatively large sample.

Methods: The children (aged 6–12 years) with ADHD were randomized to the intervention or waitlist groups. A healthy control group was composed of gender- and age-matched healthy children. The intervention group received a 12-session training program for multiple executive skills. Executive function (EF), ADHD symptoms, and social functioning in the intervention and waitlist groups were evaluated at baseline and the end of the final training session. The healthy controls (HCs) were only assessed once at baseline. Repeated measures analyses of variance were used to compare EF, ADHD symptoms, and social function between intervention and waitlist groups.

Results: Thirty-eight children with ADHD in the intervention group, 30 in waitlist group, and 23 healthy children in the healthy control group were included in final analysis. At post treatment, intervention group showed significantly lower Behavior Rating Inventory of Executive Function (BRIEF) total score (135.89 ± 16.80 vs. 146.09 ± 23.92, P= 0.04) and monitoring score (18.05 ± 2.67 vs. 19.77 ± 3.10, P= 0.02), ADHD-IV overall score (41.11 ± 7.48 vs. 47.20 ± 8.47, P< 0.01), hyperactivity-impulsivity (HI) subscale score (18.92 ± 5.09 vs. 21.93 ± 4.93, P= 0.02), and inattentive subscale score (22.18 ± 3.56 vs. 25.27 ± 5.06, P< 0.01), compared with the waitlist group. Repeated measures analyses of variance revealed significant interactions between time and group on the BRIEF inhibition subscale (F = 5.06, P= 0.03), working memory (F = 4.48, P= 0.04), ADHD-IV overall score (F = 21.72, P< 0.01), HI subscale score (F = 19.08, P< 0.01), and inattentive subscale score (F = 12.40, P< 0.01). Multiple-way analysis of variance showed significant differences on all variables of BRIEF, ADHD-rating scale-IV, and WEISS Functional Impairment Scale-Parent form (WFIRS-P) among the intervention and waitlist groups at post treatment and HCs at baseline.

Conclusions: This randomized controlled study on executive skill training in a relatively large sample provided some evidence that the training could improve EF deficits, reduce problematic symptoms, and potentially enhance the social functioning in school-aged children with ADHD.

Clinical Trial Registration: [http://www.clinicaltrials.gov; NCT02327585](http://www.clinicaltrials.gov; NCT02327585).