The effectiveness of a Stress-Management Intervention Program in behavioral parameters and hair cortisol concentrations in children with Attention Deficit Hyperactivity Disorder

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Background: Attention-deficit/hyperactivity disorder (ADHD) is the most common neurodevelopmental condition in school-aged children, with a prevalence of 5–8%1. To date, several studies have investigated the activity of the stress system, i.e., the Hypothalamic-Pituitary-Adrenal axis and the Sympathetic Nervous System, in individuals with ADHD. Attenuated biologic stress response to challenging situations has been observed in children diagnosed with ADHD2. Moreover, empirical support includes numerous randomized clinical trials, systematic reviews, and meta-analyses showing positive effects of behavior management treatments interventions on child compliance, ADHD symptoms and impairments, parent-child interactions, parenting and parenting stress3.

Objective: The current randomized controlled trial aimed at evaluating the effectiveness of an 8-week stress management program, comprising self-applied cognitive exercises, on the ADHD core symptomatology, stress perception, anxiety and sleep quality along with hair cortisol levels in prepubertal ADHD children.

Method: The current study is an 8-week, two-armed, non-blinded, randomized, controlled trial with a 1:1 allocation ratio, intervention vs wait-list control groups. Sixty (30 intervention group (IG) & 30 control group (CG)) ADHD children (65% male) aged between 7 and 12 years old took part in the study. The two groups were matched for gender and age. All children were under usual behavioral therapy care, but no pharmacotherapy. The Child Behavior Checklist (CBCL) of the Achenbach System for Empirically Based Assessment (ASEBA), the ADHD Rating Scale IV, the Personal Control Questionnaire, and the Pitsburg Sleep Questionnaire were completed by parents at baseline and after the intervention in both groups. Hair cortisol concentrations were measured in both groups at the two time-points (i.e. before and after the intervention).

Results: Statistically significant decreases after the intervention were found in the ADHD Rating Scale IV scores (inattention, hyperactivity-impulsivity and total, p<0.001 for all three scales) only within the stress-management intervention group. Similarly, the intervention group showed decreases in several scales of the CBCL: academic performance, p<0.001; internalizing problems, p=0.001; thought problems, p=0.006; externalizing problems, p=0.001; affective problems, p=0.001; anxiety, p=0.02; ADHD, p<0.001; oppositional-defiant disorder, p=0.001; conduct problems, p=0.001; sluggish-cognitive tempo, p<0.001; obsessive-compulsive disorder, p=0.001; PTSD, p=0.001. Also, improvement was shown in the Pitsburg Sleep Quality Questionnaire scores, after the intervention (p=0.003). No statistically significant differences in hair cortisol concentrations were found within groups (IG, p= 0.309 & CG, p=0.061).

Conclusion: The intervention group exhibited ameliorated ADHD symptomatology, decreased anxiety, and better sleep quality, as well as reduced internalizing and externalizing problems after the implementation of the stress management program. These findings are in accordance with previous studies implementing PSAI in adults with multiple sclerosis4, mild cognitive impairment5 and chronic insomnia6. The lack of a statistically significant difference in the hair cortisol concentrations after the 8-week intervention period, may be attributed to the short time interval between the two assessments7. We conclude that the stress management program (i.e. PSAI) as a supportive intervention to behavioral therapy, may be beneficial in children with ADHD3.

References: