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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 ADHD [2]. 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 stress [3].

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% males) 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 Pittsburg 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 Pittsburg 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 sclerosis[4], mild cognitive impairment[5] and chronic insomnia[6]. 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 assessments [7]. We conclude that the stress management program (i.e. PSAI) as a supportive intervention to behavioral therapy, may be beneficial in children with ADHD [3].

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.

Pythagorean Self Awareness Intervention (PSAI) [4]

The administered stress management program comprised 8 sessions. During the first session a detailed discussion about cognitive training, healthy lifestyle (issues on diet, physical exercise and sleep), stress management, and self-management was conducted with a researcher certified in Pythagorean Self Awareness Intervention (PSAI). The PSAI, which is based on the golden verses of Pythagoras, was practiced twice per day (in the morning and at bedtime) in a quiet place while sitting comfortably in a chair. At night, the individual had to follow three cognitive processes. Firstly, he/she had to recall every event through the day in the exact time sequence that it happened; events were categorized as follows: diet, exercise, sleep and personal contacts. In the second step, the children were asked to choose the events that seemed important to them and recall all the accompanying details. During the last step, each selected event was subjected to critical appraisal using three questions: "Is what I have done wrong? Is what I have done right? What have I omitted that I ought to have done?". After these cognitive processes the individuals were asked to set, when possible and applicable, specific goals for the day to come and in the morning to recapitulate the results of the previous night's practice without repeating the procedure.

References:

1. M. Skounti, S. Giannoukas, E. Dimitriou, S. Nikolopoulou, E. Linardakis, A. Philalithis. (2010). Prevalence of attention deficit hyperactivity disorder in schoolchildren in Athens, Greece. Association of ADHD subtypes with social and academic impairment. Atten Defic Hyperact Disord, 2(3):127-132.
2. E. Angeli, T. Korpa, EO. Johnson, F. Apostolakou , I. Papassotiriou, GP. Chrousos, P. Pervanidou. (2018). Salivary cortisol and alpha-amylase diurnal profiles and stress reactivity in children with Attention Deficit Hyperactivity Disorder. Psychoneuroendocrinology, 90:174-181.
3. LJ. Pfiffner, LM. Haack. (2014). Behavior management for school-aged children with ADHD. Child Adolesc Psychiatr Clin N Am, 23(4):731-46C.
4. Darviri, C. Zavitsanou, A. Delikou, A. Giotaki, A. Artemiadis, A. Terentiou, M. Anagnostouli, L. Varvogli, S. Vasdekis, G.P. Chrousos. (2016). Pythagorean Self-Awareness Serves Successfully as a New Cognitive Behavioral-Based Technique in Multiple Sclerosis Physical and Psychosocial Well-Being and Quality of Life. Psychology, 7(4): 572-583.
5. C. Darviri, C. Zavitsanou, A. Delikou, A. Giotaki, A. Artemiadis, A. Terentiou, G.P. Chrousos. (2016). A Novel Non-Pharmaceutical Treatment for Patients with Mild Cognitive Impairment. Psychology, 7(5):678-686.
6. S. Tsoli, S. Vasdekis, X. Tigani, A. Artemiadis, G. Chrousos, C. Darviri. (2018). A novel cognitive behavioral treatment for patients with chronic insomnia: A pilot experimental study. Complement Ther Med, 37:61-63.
7. R. Slominski, C.R. Rovnaghi, K.J. Anand. (2015). Methodological Considerations for Hair Cortisol Measurements in Children. Ther Drug Monit, 37(6): 812-20.

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