IS THERE ANY DIFFERENCE IN EXECUTIVE FUNCTIONS IN CHILDREN HAVING ADHD OR DYSLEXIA?

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INTRODUCTION: Executive functions (EFs) are neuro-cognitive processes that maintain an appropriate problem-solving set to attain a later goal. ADHD is characterized by deficits in executive functioning and difficulty in impulse control, as well as inattention and impulsivity. Specific learning disorder (SLD) or Specific Developmental Disorder of Scholastic Skills (SDDSS) commonly known as dyslexia have specific and significant impairment in learning of scholastic skills. Dyslexia is also associated with deficits in EFs and many behavioral problems seen in ADHD are also encountered in Dyslexia. This study was done to study executive functions in children having ADHD as well as Dyslexia.

OBJECTIVE: To study executive functions in children having ADHD and Dyslexia and compare with control group (healthy developing children).

RESULT: This study showed deficits in EFs in both ADHD and Dyslexia group. Deficits were seen in ADHD in working memory, verbal fluency, attention, set shifting, response inhibition while in Dyslexia, deficits were seen in working memory, verbal fluency, set shifting, attention and problem solving. Also deficits on BDEFS-CA were more in ADHD as compared to children having Dyslexia.

Figure 1. Mean scores in various domains of BDEFS-CA.

Figure 2. Mean value of the 3 groups in phonemic fluency.

Figure 3. Mean value (seconds) of Stroop test in the 3 groups.

Figure 4. Mean value (in years) of Porteus Maze.

Figure 5a. Mean value of N Back task verbal of all the 3 groups.

Figure 5b. Mean value of N Back task visual of all the 3 groups.

Figure 6a. Mean time taken (seconds) in CTT-1 and CTT-2

Figure 6b. Mean errors in CTT-1 and CTT-2

Figure 7a. Mean moves in various problems of Tower of London.

Figure 7b. Mean time taken (seconds) in Tower of London

Figure 8. Mean values in WCST.

METHODOLOGY: 20 children with ADHD, 20 children with Dyslexia and 20 normal healthy children (control) in age group 7-15 years and IQ > 90 were included in the study and were assessed for Executive Functions (EFs). EFs were assessed by N BACK task visual and verbal, Wisconsin card sorting test(WCST), Phonemic fluency, Colour trails test (CCT-1&2), Porteus maze, Stroop test and Tower of London. Parents were asked to fill questionnaires in Barkley's deficit in executive functions scale children and adolescent (BDEFS-CA)¹ for the assessment of EFs in children. Subject were administered tests for the assessment of EFs on a single day and tests were done only after withholding stimulant medications and Atomoxetine for 24 hour period.

CONCLUSION: This study showed deficits in EFs in both, children having ADHD as well as Dyslexia. It implies that these deficits are a trait deficit in ADHD and Dyslexia. Many behavioral problems encountered in ADHD and Dyslexia such as irritability, anger, aggression, impulsivity can be attributed to EFs and this can lead to academic under achievement. Therefore, it suggests a need to address these deficits by specific remediation which can help in improving these deficits, along with pharmacological treatment.