

# NEWSLETTER



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## **BIBLIOGRAFIA ADHD GENNAIO 2019**

ADHD Atten Deficit Hyperact Disord. 2019.

**IS THERE A PRODROM PERIOD IN PATIENTS WITH SOCIAL ANXIETY DISORDER? A DISCUSSION ON THE HYPOTHESIS OF SOCIAL ANXIETY DISORDER DEVELOPMENT SECONDARY TO ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.**

***Koyuncu A, Ince E, Ertekin E, et al.***

The association between social anxiety disorder (SAD) and attention-deficit/hyperactivity disorder (ADHD) is poorly established. In fact, increasing and converging evidences suggest that there is a close relationship between the two disorders. High comorbidity rate between these two disorders, follow-up studies showing high rates of later development of SAD in ADHD and treatment studies in which ADHD medications have been helpful for both conditions all indicate this relationship. Recently, we have published a hypothesis regarding the development of SAD secondary to ADHD. In this hypothesis, we recognized that patients with SAD seem to go through a prodromal period that we labeled as pre-social anxiety. Detecting patients in this period before meeting full-blown SAD criteria provides early intervention and prevention of SAD. New, comprehensive follow-up studies which will investigate whether ADHD causes later SAD secondarily are needed. In the current review, taken into account our developmental hypothesis, we will discuss whether high comorbidity of SAD and ADHD is a chance finding (i.e., the two disorders are found in cases with no causal relationship between them) or can SAD develop secondarily due to childhood ADHD. Is there a prodrom period in patients with SAD as in cancer or psychosis patients? We are going to summarize the overlapping features of SAD and ADHD in terms of child/parents interaction and family issues, aversive childhood experiences, social skill deficits, and development of cognitive distortions

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**Per la ricerca degli articoli pubblicati nella letteratura scientifica nel mese in esame sono state consultate le banche dati Medline, Embase, PsycINFO e PsycArticle utilizzando le seguenti parole chiave (o i loro sinonimi): 'Attention deficit disorder', 'Attention deficit hyperactivity disorder', 'Infant', 'Child', 'Adolescent', 'Human'. Sono qui riportate le referenze considerate rilevanti e pertinenti.**

ADHD Atten Deficit Hyperact Disord. 2019.

**IS THERE A PRODRUM PERIOD IN PATIENTS WITH SOCIAL ANXIETY DISORDER? A DISCUSSION ON THE HYPOTHESIS OF SOCIAL ANXIETY DISORDER DEVELOPMENT SECONDARY TO ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.**

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Am J Emerg Med. 2019.

**PREVALENCE OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) IN CHILDREN PRESENTING WITH FOREIGN BODY INGESTION.**

**Turgut K, Poyraz MK, Sekmen E, et al.**

**Background:** Foreign body ingestion is a common condition in children. We aimed to compare the incidence of attention deficit hyperactivity disorder (ADHD) symptoms in children that ingested foreign bodies with healthy children.

**Methods:** The study group consisted of 3- to 17-year-old pediatric patients admitted to the emergency department after foreign body ingestion, and the control group was formed with children having similar demographic and cultural characteristics that presented to the same department for non-traumatic causes. After initial intervention and stabilization, we administered the Conners' Parent Rating Scales-Revised (CPRS-R) to both groups.

**Results:** The study group consisted of 53 patients with a mean age of 7.83 ± 4.36 and the control group comprised 47 children with a mean age of 7.72 ± 3.48 years. There were no statistically significant differences between the study and control groups in terms of age, gender, and parental education levels ( $p > 0.05$  for each). The foreign objects most ingested by children were coins (32.1%), followed by needles (15.1%) and beads (9.4%), and all the patients recovered without complications and were discharged. All the CPRS-R subscale scores were significantly higher in the study group than in the control group ( $p < 0.001$ ). The parental education levels of the study group were not significantly correlated with DSM-IV hyperactivity-impulsivity and DSM-IV total.

**Conclusion:** We found that the incidence of ADHD symptoms may be high in children referred to emergency services after accidentally ingesting foreign bodies

Am J Med Genet Part B Neuropsychiatr Genet. 2019.

**ADHD RISK GENES INVOLVED IN DOPAMINE SIGNALING AND METABOLISM ARE ASSOCIATED WITH REDUCED ESTIMATED LIFE EXPECTANCY AT YOUNG ADULT FOLLOW-UP IN HYPERACTIVE AND CONTROL CHILDREN.**

**Barkley RA, Smith KM, Fischer M.**

ADHD is associated with an elevated risk of mortality and reduced estimated life expectancy (ELE) by adulthood. Reduced life expectancy is substantially related to the trait of behavioral disinhibition; a correlate

of both ADHD and of several dopamine genes related to dopamine signaling and metabolism. We therefore hypothesized that several ADHD risk genes related to dopamine might also be predictive of reduced ELE. Using a longitudinal study of 131 hyperactive children and 71 control cases followed to young adulthood, we examined whether several polymorphisms involving DRD4, DAT1, and DBH were related to ELE. The homozygous 9/9 allele of DAT1 and the heterozygous allele of DBH TaqI were associated with 5- and 2-year reductions, respectively, in total ELE. They did not operate on ELE through any relationships to ADHD specifically or behavioral disinhibition more generally. Instead, they showed links to alcohol use (DBH), reduced education, smoking, and reduced exercise (DAT1) employed in the computation of ELE. We conclude that polymorphisms of two dopamine genes are linked to reductions in ELE independently of their association with ADHD

Am J Psychiatry. 2019;176:57-66.

**MULTIMODAL STRUCTURAL NEUROIMAGING MARKERS OF BRAIN DEVELOPMENT AND ADHD SYMPTOMS.**

**Ball G, Malpas CB, Genc S, et al.**

**Objective:** Attention deficit hyperactivity disorder (ADHD) is a multifactorial disorder with diverse associated risk factors and comorbidities. In this study, the authors sought to understand ADHD from a dimensional perspective and to identify neuroanatomical correlates of traits and behaviors that span diagnostic criteria.

**Methods:** Multimodal neuroimaging data and multiinformant cognitive and clinical data were collected in a densely phenotyped pediatric cohort (N=160; 70 with ADHD; age range, 9-12 years). Multivariate analysis identified associations between clinical and cognitive factors and multimodal neuroimaging markers (across tissue volume, cortical thickness, cortical area, and white matter microstructure). The resulting imaging markers were validated in an independent cohort (N=231; 132 with ADHD; age range, 7-18 years).

**Results:** Four novel patterns of neuroanatomical variation that related to phenotypic variation were identified. The first imaging pattern captured association of head size with sex, socioeconomic status, and mathematics and reading performance. The second pattern captured variation associated with development and showed that individuals with delayed development were more likely to be receiving ADHD medication. The third pattern was associated with hyperactivity, greater comorbidities, poorer cognition, lower parental education, and lower quality of life. The fourth pattern was associated with a particular profile of poorer cognition and irritability independent of ADHD. The authors further demonstrated that these imaging patterns could predict variation in age and ADHD symptoms in an independent cohort.

**Conclusions:** The findings suggest that ADHD presentation may arise from a summation of several clinical, developmental, or cognitive factors, each with a distinct neuroanatomical foundation. This informs the neurobiological foundations of ADHD and highlights the value of detailed phenotypic data in understanding the neurobiology underlying neurodevelopmental disorders

ANAE Approche Neuropsychol Apprentiss Enfant. 2018;30:723-30.

**ATTENTION-DEFICIT DISORDERS AND IMPACT OF PAROXYSMAL INTERICTAL EEG DISCHARGES IN CHILDHOOD EPILEPSIES: PRESENTATION OF A NOVEL COMPUTERIZED TEST OF SUSTAINED ATTENTION, SYNCHRONIZED TO EEG.**

**Herbillon V, De BJ, Gerard D, et al.**

In childhood epileptic disorders, the majority of tests measuring sustained attention are performed beyond seizure occurrence and electroencephalographic recordings. Here we present a novel sustained attention test, easy to handle in the clinical setting, which permits to assess the stability of attention and its physiological fluctuations and thus potentially permits to identify subtle sources of distraction such as interictal EEG discharges

An Pediatr. 2019.

**THE USE OF STRENGTH AND DIFFICULTIES QUESTIONNAIRE IN PSYCHOSOCIAL EVALUATION AND ATTENTION DEFICIT HYPERACTIVITY DISORDER SCREENING IN PRETERM INFANTS.**

**Bachiller-Carnicero L, Garcia-Soria CE, Piris-Borregas S, et al.**

**Introduction:** Behavioural disorders and learning disabilities are often recognised in < 1,500 g or < 32 weeks very low birth weight (VLBW) infants. There is very limited data in the Spanish population.

**Objective:** To determine the presence of psychosocial disorders in preterm infants at 6 years of age, as assessed by the strength and difficulties (SDQ) questionnaire, in comparison to a reference population. To set a cut-off value to use SDQ as a screening tool for attention deficit hyperactivity disorder (ADHD) in the preterm child.

**Participants and methods:** A prospective observational study was conducted on premature children assessed at 6 years of age using the SDQ. Perinatal variables, neurodevelopment, and diagnosis of ADHD, according to the DSM-5, were collected.

**Results:** A total of 214 children who met all the requirements, were included. When compared with the reference population they had significantly higher scores in emotional symptoms, in peer relationships, and in the total score of the test. The hyperactivity scale and the total test score are good predictors of a diagnosis of ADHD, with an area under the ROC curve of 0.83 (95% CI: 0.76-0.90) for hyperactivity, and 0.87 (95% CI: 0.80-0.93) for the total score. The scores for hyperactivity and the total test, from which the screening for ADHD could be considered positive would be 6 and 13 respectively, and a combination of hyperactivity 5 and total score 12.

**Conclusions:** Preterm children are at higher risk of emotional and peer relationship problems than those born full term. The SDQ test could be used for ADHD screening

Ann Med -Psychol. 2019.

**NEAR (NEUROPSYCHOLOGICAL EDUCATIONAL APPROACH TO COGNITIVE REMEDIATION) COGNITIVE REMEDIATION PROGRAM IN ADOLESCENTS WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER AND/OR AUTISM SPECTRUM DISORDER.**

**Renou S, Doyen C.**

**Objectives:** Cognitive Remediation is a therapeutic approach based on the notion of brain plasticity. It aims to improve certain cognitive function deficits through the repetition of specific exercises and to promote the metacognitive dimension (the awareness and reflection of an individual on his cognitions, his behaviors and the strategies he uses to solve a problem). Several programs have already been validated in adult patients with schizophrenia and have shown improvements in cognitive performance and functioning. Some of the programs were later applied to other pathologies such as anorexia nervosa or autism spectrum disorders (ASD). Remedial programs have also been developed for children and adolescents because the early symptomatic expression of certain disorders such as Attention Deficit Hyperactivity Disorder (ADHD) or ASD makes one suspect a neurodevelopmental origin and all have in common an alteration of the executive functions. There are programs of cognitive stimulation or cognitive training, particularly in the context of ADHD. Although the results do show benefits in terms of visual and verbal working memory, the effects of cognitive training seem to be difficult to generalize to other everyday learning and have only limited effects on the symptoms. The objective of this study is to assess the feasibility and acceptability of the Neuropsychological Educational Approach to Cognitive Remediation for Adolescents (NEAR).

**Patients or materials and methods:** The Department of Child and adolescent Psychopathology of the Sainte-Anne Hospital (Paris), part of the reference center for remediation and psychosocial rehabilitation (C3RP), used NEAR, originally developed for adult schizophrenic patients, with four preadolescents and adolescents aged 11 to 15 years with either ADHD or ASD. The IQ ranged from 80 to 112 and none was under medication. This method combines cognitive exercises and Cognitive-Behavioral Therapy groups. The interest is in working simultaneously on cognitive functions such as memory, executive functions, attention, visuospatial abilities and the metacognitive dimension by building bridges between what has been worked on in the sessions and examples from daily life. One of the main focuses in the NEAR method is the principle of encouraging intrinsic motivation. The method also aims to restore confidence in the ability to acquire skills,

to overcome certain failures regularly encountered by these adolescents in their schooling and to encourage the generalization and transfer of learning to other situations or contexts from daily life.

**Results:** The first observations show that this program is applicable and adapted to preadolescents and adolescents as well as to the pathologies targeted in this group. The participants reported improvement in memory. They also emphasized the benefits in attention and planning. Moreover, the adolescents report that the majority of learning has been transferable to the school environment. The commonest example was the use of techniques to improve their memory such as making a list, verbalizing (stating either aloud or mentally the subject matter of a course) or organizing information. Others have used attentional strategies learned during the group such as condensing information, pausing, using verbalization, or reducing sensory distractors. Another positive aspect of the group reported by all teenagers was the pleasure of seeing each other again every week, the perceived support and the development of self-help skills.

**Conclusion:** Cognitive Remediation is now an additional therapeutic tool, which can empower other therapeutic approaches with no significant side effects. The development and evaluation of programs targeting a wider range of neuropsychological deficits than the NEAR program seems to us to be a future direction because children do not all have the same neuropsychological profile and they are often affected by several neuropsychological deficits. The first application of this program in adolescents is taking place within the Department of Child and Adolescent Psychiatry of the Sainte-Anne Hospital Centre. Neuropsychological and functional evaluations on a larger sample are underway

Autism. 2018.

**CLINICAL CORRELATES OF SLUGGISH COGNITIVE TEMPO IN ADOLESCENTS WITH AUTISM SPECTRUM DISORDER.**

***Duncan A, Tamm L, Birnschein AM, et al.***

Adolescents with autism spectrum disorder frequently experience social communication difficulties, executive functioning deficits, and anxiety and depressive symptoms, which are similar to the symptoms and correlates of sluggish cognitive tempo. Although sluggish cognitive tempo is related to, but distinct from, the inattentive and hyperactive-impulsive symptoms of attention-deficit/hyperactivity disorder that commonly co-occur with autism spectrum disorder, few studies have examined sluggish cognitive tempo in autism spectrum disorder. We examined whether sluggish cognitive tempo and attention-deficit/hyperactivity disorder were differentially associated with autism symptomatology, daily life executive functioning, and internalizing and externalizing symptoms in 51 adolescents (ages 13-18 years) with autism spectrum disorder without intellectual disability. Regression analyses controlling for age and IQ showed that sluggish cognitive tempo symptoms, but not attention-deficit/hyperactivity disorder symptoms, were associated with increased autism symptomatology and internalizing symptoms. Attention-deficit/hyperactivity disorder symptoms, but not sluggish cognitive tempo symptoms, were associated with increased externalizing behaviors and behavior regulation deficits. Both sluggish cognitive tempo and attention-deficit/hyperactivity disorder were independently associated with increased metacognitive deficits. This study provides preliminary evidence that sluggish cognitive tempo symptoms are elevated in autism spectrum disorder and associated with key clinical correlates, with implications for the assessment and treatment in adolescents with autism spectrum disorder

Autism. 2018.

**DELAYED AUTISM SPECTRUM DISORDER RECOGNITION IN CHILDREN AND ADOLESCENTS PREVIOUSLY DIAGNOSED WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.**

***Kentrou V, de Veld DMJ, Mataw KJK, et al.***

Phenotypic elements of autism spectrum disorder can be masked by attention-deficit/hyperactivity disorder symptoms, potentially leading to a misdiagnosis or delaying an autism spectrum disorder diagnosis. This study explored differences in the age of autism spectrum disorder diagnosis between participants with previously diagnosed attention-deficit/hyperactivity disorder versus autism spectrum disorder only respondents. Children and adolescents, but not adults, initially diagnosed with attention-deficit/hyperactivity



disorder received an autism spectrum disorder diagnosis an average of 1.8 years later than autism spectrum disorder only children, although the findings regarding the adult sample should be interpreted with caution. Gender differences were also explored, revealing that the delay in receiving an autism diagnosis was 1.5 years in boys and 2.6 years in girls with pre-existing attention-deficit/hyperactivity disorder, compared with boys and girls without prior attention-deficit/hyperactivity disorder. No significant gender differences were observed in the adult sample. We argue that overlapping symptoms between autism spectrum disorder and attention-deficit/hyperactivity disorder might delay a formal diagnosis of autism either by leading to a misdiagnosis of attention-deficit/hyperactivity disorder or by making it difficult to identify the presence of co-occurring autism spectrum disorder conditions once an initial diagnosis of attention-deficit/hyperactivity disorder has been obtained. Current findings highlight the need to recruit multidimensional and multidisciplinary screening procedures to assess for potential emerging autism spectrum disorder hallmarks in children and adolescents diagnosed or presenting with attention-deficit/hyperactivity disorder symptoms

Autism Res. 2018;11:1690-700.

**Psychiatric Comorbidities and Psychotropic Medication Use in Autism: A Matched Cohort Study with ADHD and General Population Comparator Groups in the United Kingdom.**

**Houghton R, Liu C, Bolognani F.**

Psychiatric comorbidities and use of psychotropic medications are common among patients with autism spectrum disorder (ASD). However, most previous research used data from the United States (US) and few studies have compared medication use in ASD to control groups, making contextualization of results difficult. In the United Kingdom (UK), general practitioners play a key role in the management of ASD. We conducted a retrospective, cross-sectional study over calendar year 2015, using primary care data from the UK. We identified a prevalent cohort of ASD cases ( $n = 10,856$ ) and matched control groups of (a) general population ( $n = 21,712$ ) and (b) attention deficit hyperactivity disorder (ADHD;  $n = 7,058$ ) on age, sex and region. We described psychiatric comorbidities, psychotropic medications, and healthcare utilization in all three cohorts. Within the ASD cohort, we used multivariable logistic regression models to explore associations between patient characteristics and the outcomes of: any psychotropic medication, polypharmacy, and number of primary care visits. We used conditional logistic regression to compare the ASD and control groups. Psychiatric comorbidities were recorded for 41.5% of ASD patients; 32.3% received psychotropic medication and 9.8% received polypharmacy. Increased age and all psychiatric comorbidities (except conduct disorder) were associated with treatment use. Males were less likely to receive a treatment than females [Odds ratio (OR) 0.74 (0.66–0.83)]. ASD patients were more likely to take psychotropic medications than the general population [OR 4.91 (4.46–5.40)], but less likely compared to ADHD patients [OR 0.40 (0.37–0.44)]. Overall, rates of medication use in the UK were lower than those previously reported in the US. Autism Research 2018, 11: 1690–1700. © 2018 International Society for Autism Research, Wiley Periodicals, Inc. Lay Summary: We used electronic medical records from the UK, to describe the amount of psychiatric comorbidities, psychotropic medication use and healthcare resource use in ASD. Around one in three people with ASD were prescribed a psychotropic medication, which was more than the general population, but less than for those with ADHD. Increased age, psychiatric comorbidities and female gender were all independently associated with psychotropic medication use. Rates of medication use in the UK were lower than those previously reported in the US

Autism Res. 2019.

**BRIEF SOCIAL ATTENTION BIAS MODIFICATION FOR CHILDREN WITH AUTISM SPECTRUM DISORDER.**

**Alvares GA, Chen NTM, Notebaert L, et al.**

Reduced social attention is a hallmark feature in autism spectrum disorder (ASD), emerging as early as the first year of life. This difference represents a possible mechanism impacting upon the development of more complex social-communicative behaviors. The aim of this study was to develop and test the efficacy of a novel attention bias modification paradigm to alter social attention, specifically orienting to faces. Children

with ASD (n = 66), aged between 5 and 12 years, were randomized to play either a social attention training or control game for 15 min. Children playing the training game were reinforced for attending to and engaging with social characters, whereas children in the control group were equally rewarded for attending to both social and non-social characters. Eye-tracking measures were obtained before and after gameplay. There was a significant increase in the percentage of first fixations to faces, relative to objects, after social attention training compared to a control group, associated with a medium effect size (partial  $\eta^2 = 0.15$ ). The degree of social attention change in the training group was inversely associated with restricted and repetitive behaviors and moderated by comorbid attention deficit hyperactivity disorder diagnoses, suggestive of differential training effects based on individual symptom profiles. By using the principles of attention bias modification, we demonstrated that social attention can be acutely modified in children with ASD, with an increased tendency to orient attention toward faces after brief social attention training. Modifying attentional biases may therefore represent a potential novel mechanism to alter the development of social communication trajectories. *Autism Research* 2019. © 2019 International Society for Autism Research, Wiley Periodicals, Inc. Lay Summary: Some children with autism spectrum disorder (ASD) do not look at faces or eyes as much as their non-ASD peers do. Using a game where players have to pay attention to characters with faces to score points, we found that children playing the game began to look more at faces, even outside of the game. Looking at faces is an important prerequisite to many social interactions, telling us about others' emotions and states of attention. Things that become harder to understand when they are not seen. If children with ASD could use games to help train looking at faces in real life, then they may be in a better position to understand and participate in social exchanges

Autism Res. 2019.

**ATOMOXETINE FOR ATTENTION DEFICIT HYPERACTIVITY DISORDER IN CHILDREN AND ADOLESCENTS WITH AUTISM: A SYSTEMATIC REVIEW AND META-ANALYSIS.**

***Patra S, Nebhinani N, Viswanathan A, et al.***

Atomoxetine is prescribed to children with autism spectrum disorder having symptoms of attention deficit hyperactivity disorder. We sought to examine the efficacy and safety of atomoxetine in this population. After screening for inclusion criteria, we identified three randomized placebo controlled trials involving 241 children. We assessed internal validity using standard Cochrane Risk of bias tool for randomized controlled trials (RCTs). We used Revman 5.3 for meta-analysis and GRADE approach to create summary of findings with grading of the quality of evidence. Atomoxetine had a benefit on improving parent-rated hyperactivity (standardized mean difference [SMD] =  $-0.73$ , 95% Confidence Interval, CI =  $-1.15$  to  $-0.34$ ) and parent-rated inattention (SMD =  $-0.53$ , 95% CI =  $-0.93$  to  $-0.12$ ) but the magnitude of effects is uncertain. However, atomoxetine was also associated with increased risk of non-serious adverse effects like nausea and vomiting, decreased sleep, and decreased appetite. Atomoxetine may be effective in improving hyperactivity and inattention in children with autism spectrum disorder and attention deficit hyperactivity disorder. However, we are uncertain about the true effect of this intervention and need more RCTs trials designed to evaluate this. *Autism Research* 2019. © 2019 International Society for Autism Research, Wiley Periodicals, Inc. Lay Summary: Atomoxetine is prescribed for Attention Deficit Hyperactivity Disorder (ADHD). About a third of children and adolescents with autism also suffer from ADHD. We carried out an analysis of data reported from a specific kind of medication trials which had examined the effectiveness and side effects of atomoxetine in this patient population. We could find only three such trials and analyzed the reported data. Our analysis revealed that atomoxetine is effective in improving symptoms of ADHD like hyperactivity and inattention and also causes side effects like nausea, vomiting, decreased sleep, and decreased appetite. However, the existing data are insufficient to provide a conclusive statement with certainty and more trials are needed for this



Behav Neurol. 2018 Nov;2018.

**Sociodemographic, electrophysiological, and biochemical profiles in children with attention deficit hyperactivity disorder and/or epilepsy.**

**Abd El Naby SA, Naguib YM.**

Attention deficit hyperactivity disorder (ADHD) is among the most prevalent neurobehavioral disorders affecting children worldwide. The prevalence of ADHD is higher in children with epilepsy. Despite the plethora of conducted work, the precise cause of ADHD is not identified yet. We studied here the sociodemographic, clinical, electrophysiological, and biochemical profiles of children with ADHD, epilepsy, and ADHD with epilepsy. Subjects were divided into 4 groups (25 child/group): I—control, II—ADHD, III—epilepsy, and IV—ADHD with epilepsy. Male to female ratio was significantly ( $p < 0.05$ ) higher in the ADHD (3.1) and ADHD with epilepsy (2.1) groups when compared to the control (1.08) or epilepsy (1.08) groups. Positive family history was significantly evident in patients with epilepsy and ADHD with epilepsy, but not in the control or ADHD groups. Speech development was significantly delayed in the ADHD and ADHD with epilepsy groups. EEG abnormalities were detected in patients with ADHD (12%) and ADHD with epilepsy (68%). Focal frontal activities were significantly detectable in the ADHD (100%) and ADHD with epilepsy (77.8%) groups, whereas focal temporal activity was significantly present in the epilepsy (83.3%) group. Serum ferritin was significantly lower in the ADHD group ( $110.27 \pm 6.64$  ?g/ml) when compared to the control ( $134.23 \pm 14.82$  ?g/ml), epilepsy ( $159.66 \pm 33.17$  ?g/ml), and ADHD with epilepsy ( $203.04 \pm 50.64$  ?g/ml) groups. Serum zinc was significantly higher in the ADHD, epilepsy, and ADHD with epilepsy groups ( $236.63 \pm 20.89$ ,  $286.74 \pm 43.84$ , and  $229.95 \pm 67.34$  µg/dl, respectively), when compared to the control group ( $144.21 \pm 17.40$  µg/dl). Serum adenosine deaminase was insignificantly different among the groups. Our results indicate that gender and family history are significant moderators in the aetiology of ADHD and epilepsy or their comorbidity. We also demonstrated that EEG could be central in the assessment of ADHD with epilepsy cases. Serum ferritin and zinc alteration may contribute significantly in ADHD and epilepsy pathophysiology

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Biol Psychiatry. 2019;85:408-16.

**POLYGENIC RISK AND NEURAL SUBSTRATES OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS IN YOUTHS WITH A HISTORY OF MILD TRAUMATIC BRAIN INJURY.**

**Stojanovski S, Felsky D, Viviano JD, et al.**

**Background:** Attention-deficit/hyperactivity disorder (ADHD) is a major sequela of traumatic brain injury (TBI) in youths. The objective of this study was to examine whether ADHD symptoms are differentially associated with genetic risk and brain structure in youths with and without a history of TBI.

**Methods:** Medical history, ADHD symptoms, genetic data, and neuroimaging data were obtained from a community sample of youths. ADHD symptom severity was compared between those with and without TBI (TBI  $n = 418$ , no TBI  $n = 3193$ ). The relationship of TBI history, genetic vulnerability, brain structure, and ADHD symptoms was examined by assessing 1) ADHD polygenic score (discovery sample ADHD  $n = 19,099$ , control sample  $n = 34,194$ ), 2) basal ganglia volumes, and 3) fractional anisotropy in the corpus callosum and corona radiata.

**Results:** Youths with TBI reported greater ADHD symptom severity compared with those without TBI. Polygenic score was positively associated with ADHD symptoms in youths without TBI but not in youths with TBI. The negative association between the caudate volume and ADHD symptoms was not moderated by a history of TBI. However, the relationship between ADHD symptoms and structure of the genu of the corpus callosum was negative in youths with TBI and positive in youths without TBI.

**Conclusions:** The identification of distinct ADHD etiology in youths with TBI provides neurobiological insight into the clinical heterogeneity in the disorder. Results indicate that genetic predisposition to ADHD does not increase the risk for ADHD symptoms associated with TBI. ADHD symptoms associated with TBI may be a result of a mechanical insult rather than neurodevelopmental factors

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Biomedical Journal. 2018;41:356-63.

**Subjective and objective assessments of sleep problems in children with attention deficit/hyperactivity disorder and the effects of methylphenidate treatment.**

**Chin W-C, Huang Y-S, Chou Y-H, et al.**

**Background:** to investigate the sleep problems in children with different ADHD presentations and effects of methylphenidate (MPH) on the sleep problems of children with ADHD by both subjective and objective measurements.

**Methods:** 71 children with ADHD and 30 controls were included. 35 had ADHD with predominantly inattentive presentation (ADHD-I) and 36 with predominantly hyperactive/impulsive or combined presentation (ADHD-C). We used the pediatric sleep questionnaire (PSQ) and a nocturnal polysomnography (PSG) to assess the sleep problems in children with ADHD before and 6 months after being treated with methylphenidate (0.3-0.7 mg/kg/dose).

**Results:** PSG showed significantly higher apnea-hypopnea index and hypopnea counts, and lower slow-wave sleep percentage in children with ADHD. The results of PSQ reported by parents showed significantly higher rates of delay initiation of sleep, sleep onset latency, sleep fragment, daytime sleepiness, enuresis, bruxism, nightmares, periodic limb movement disorder (PLMD), and snoring in children with ADHD compared to normal controls. Comparisons of ADHD presentations revealed no significant difference between ADHD-I and ADHD-C by either PSG or PSQ measurements. After 6-month MPH treatment, the PSG showed significantly increased total sleep time and reduced periodic limb movement index (PLMI). The PSQ indicated significant reduction in bruxism and snoring in ADHD-I, as well as nightmares in ADHD-C, and both subgroups showed significant reduction in PLMD.

**Conclusion:** subjective and objective approaches produced inconsistent findings regarding the sleep problems in children with ADHD. Besides, MPH didn't worsen the sleep problems in children with ADHD

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BMC Pediatr. 2019;19.

**PROTOCOL FOR A TRANSDIAGNOSTIC STUDY OF CHILDREN WITH PROBLEMS OF ATTENTION, LEARNING AND MEMORY (CALM) 17 PSYCHOLOGY AND COGNITIVE SCIENCES 1701 PSYCHOLOGY 17 PSYCHOLOGY AND COGNITIVE SCIENCES 1702 COGNITIVE SCIENCES 11 MEDICAL AND HEALTH SCIENCES 1117 PUBLIC HEALTH AND HEALTH SERVICES.**

**Holmes J, Bryant A, Gathercole SE.**

**Background:** A substantial proportion of the school-age population experience cognitive-related learning difficulties. Not all children who struggle at school receive a diagnosis, yet their problems are sufficient to warrant additional support. Understanding the causes of learning difficulties is the key to developing effective prevention and intervention strategies for struggling learners. The aim of this project is to apply a transdiagnostic approach to children with cognitive developmental difficulties related to learning to discover the underpinning mechanisms of learning problems.

**Methods:** A cohort of 1000 children aged 5 to 18 years is being recruited. The sample consists of 800 children with problems in attention, learning and / memory, as identified by a health or educational professional, and 200 typically-developing children recruited from the same schools as those with difficulties. All children are completing assessments of cognition, including tests of phonological processing, short-term and working memory, attention, executive function and processing speed. Their parents/ carers are completing questionnaires about the child's family history, communication skills, mental health and behaviour. Children are invited for an optional MRI brain scan and are asked to provide an optional DNA sample (saliva). Hypothesis-free data-driven methods will be used to identify the cognitive, behavioural and neural dimensions of learning difficulties. Machine-learning approaches will be used to map the multi-dimensional space of the cognitive, neural and behavioural measures to identify clusters of children with shared profiles. Finally, group comparisons will be used to test theories of development and disorder.

**Discussion:** Our multi-systems approach to identifying the causes of learning difficulties in a heterogeneous sample of struggling learners provides a novel way to enhance our understanding of the common and complex needs of the majority of children who struggle at school. Our broad recruitment criteria targeting all children with cognitive learning problems, irrespective of diagnoses and comorbidities, are novel and make

our sample unique. Our dataset will also provide a valuable resource of genetic, imaging and cognitive developmental data for the scientific community

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BMJ Open. 2018;8.

**EFFECTS OF A MINDFULNESS-BASED INTERVENTION (MYMIND) FOR CHILDREN WITH ADHD AND THEIR PARENTS: PROTOCOL FOR A RANDOMISED CONTROLLED TRIAL.**

**Chan SKC, Zhang D, B+Âgels SM, et al.**

**Introduction** Mindfulness is one of the potential alternative interventions for children with attention-deficit hyperactivity disorder (ADHD). Some evidence suggests that mindfulness is related to changes in brain regions associated with ADHD. The potential benefits of mindfulness on children with ADHD, as well as the feasibility of this intervention approach, are warranted through prior local and foreign studies. This study aims to evaluate the effect of mindfulness-based group intervention for children with ADHD and their respective parents through a robust research design.

**Methods and analysis** This study will adopt a randomised controlled trial design including 140 children aged 8-12 years with ADHD together with one of their parents (n=140). These families will be randomised into intervention group (n=70) who will be offered the MYmind programme delivered by trained healthcare professionals, and an active control group (n=70) who will be offered the CBT programme. The intervention includes 8 weekly 90 min group sessions for children with ADHD (aged 8-12 years) and their respective parents. The primary and secondary outcomes will include children's attention, ADHD-related symptoms, behaviours, executive function and mindfulness levels measured by validated objective measures and parent's reported instruments. Parents' parental stress, parenting styles, ADHD related symptoms, well-being, rumination level and mindfulness levels will also be measured. Analysis is by intention to treat. The effects of intervention will be evaluated by comparing outcomes between the two arms, as well as comparing outcomes within subject through comparing measurements at baseline (T0), immediately after the 8 week intervention (T1) and at 3 (T2) and 6 (T3) months postintervention.

**Ethics and dissemination** Ethics approval has been granted by the Joint Chinese University of Hong Kong-New Territories East Cluster Clinical Research Ethics Committee (The Joint CUHK-NTEC CREC). Participants will be required to sign informed consent form from both parents and children. Findings will be reported in conferences and peer-reviewed publications in accordance with recommendations of Consolidated Standards of Reporting Trials.

**Trial registration number** ChiCTR1800014741; Pre-results

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Brain Imaging Behav. 2019.

**STRUCTURAL CONNECTIVITY IN ADOLESCENT SYNTHETIC CANNABINOID USERS WITH AND WITHOUT ADHD.**

**Celik Z.C., Colak C., Di Biase MA, et al.**

Synthetic cannabinoids (SC) have become increasingly popular in the last few years, especially among adolescents. Given ADHD is overrepresented in patients with substance use across adolescents compared to the general population, the current study aims were two-fold: i) examine structural brain network topology in SC users compared to healthy controls and, ii) examine the influence of ADHD on network topology in SC users. Diffusion-weighted magnetic resonance imaging scans were acquired from 27 SC users (14 without ADHD and 13 with ADHD combined type) and 13 controls. Structural networks were examined using network-based statistic and connectomic analysis. We found that SC users without ADHD had significantly weaker connectivity compared to controls in bilateral hemispheres, most notably in edges connecting the left parietal and occipital regions. In contrast, SC users with ADHD showed stronger structural connectivity compared to controls. In addition, adolescent SC users with ADHD, but not without ADHD, displayed reduced network organization, indicated by lower clustering coefficient and modularity, suggesting that poor structural network segregation and preserved structural network integration. These results suggest that comorbidity of ADHD and substance dependence may show different structural connectivity alterations than substance use

alone. Therefore, future connectivity studies in the substance use population should account for the presence of ADHD in their samples, which may be associated with disparate connectivity profiles

Brain Stimul. 2019;12:417.

**REDUCED MOTOR CORTEX MODULATION DURING RESPONSE INHIBITION TASK CORRELATES WITH WORSE PERFORMANCE MORE SEVERE CLINICAL AND MOTOR IMPAIRMENT IN CHILDREN WITH ADHD.**

**Gilbert D, Wu S, Horn P, et al.**

**Objective:** Children with Attention Deficit/Hyperactivity Disorder (ADHD) consistently demonstrate impaired inhibitory control of behavior. We sought to determine whether physiology of M1 during engagement in a response inhibition tasks differs in children with ADHD and, if so, what factors might account for those differences.

**Methods:** Case-control study of 8-12 year-old children. Behavioral ratings, motor skill (assessed using standardized motor exam), and M1 physiology were evaluated in 131 right-handed children (66 ADHD: mean 10.5 years, 43 male; 65 TD: mean 10.6 years, 42 male). TMS was performed using Magstim (Magstim, UK) stimulator and a round 90 mm coil at the vertex. TMS pulses at rest (20 trials) and during a response inhibition task with pulses timed at 150 msec before a target Go response (60 trials) and 150 msec after a Stop cue (20 trials) were compared. Motor evoked potentials (MEPs) were recorded using surface EMG. MEP amplitudes under experimental conditions were evaluated using mixed, repeated models, accounting for clinical data.

**Results:** Upward modulation of M1 excitability increased from rest to task state ( $F_{1,9533} = 1630.0$ ;  $p < 0.0001$ ). There was less modulation in children with ADHD ( $p = 0.04$ ), with lower modulation associated with higher (worse) ADHD behavioral ratings ( $p < 0.005$ ) and worse motor skills ( $p < 0.0001$ ).

**Conclusion:** Children with ADHD show anomalous M1 physiology, with less inhibition in both rest and response control task states, and less excitatory-modulation from rest to task state. Keywords: children, ADHD, response inhibition, motor cortex

Brain Stimul. 2019;12:521.

**A NOVEL NEUROTHERAPY OF TRANSCRANIAL DIRECT CURRENT STIMULATION (tDCS) COMBINED WITH COGNITIVE TRAINING IN ADHD CHILDREN.**

**Westwood S, Asherson P, Cohen KR, et al.**

**Introduction:** The frontline treatment for ADHD is psycho-stimulants, but these are not effective in  $\sim 30\%$  of patients, have side effects and limited long-term efficacy. An alternative treatment might be transcranial direct current stimulation (tDCS), which can lead to long-lasting gains in the function of targeted brain regions by potentiating neural plasticity; underpinned by dopamine and noradrenaline release, which is dysfunctional in ADHD. In ADHD, several small studies showed improved clinical and/or cognitive measures of inattention and inhibition with anodal-tDCS. However, these mainly targeted the dorsolateral prefrontal regions with single session stimulation. The right inferior frontal cortex (rIFC) might be a more optimal target since it is a hub for self-control and attention that is consistently underactive in ADHD and upregulated with psycho-stimulants. Further, multiple sessions paired with cognitive training can prolong tDCS effects for up to 12 months in healthy controls. We conducted the first study targeting the rIFC with multi-session tDCS combined with cognitive training in ADHD children.

**Method:** In a double-blind, randomized, placebo-controlled parallel trial, we administered clinical and cognitive measures of inattention and inhibition pre, post- and 6-months after 15 sessions (20 minutes daily for 3 weeks) of 1mA anodal-tDCS applied to the rIFC combined with cognitive training of executive functions in 40 boys with ADHD (aged 10 to 18). Twenty boys received sham tDCS and cognitive training.

**Results:** Preliminary data based on 15 ADHD boys showed that real compared to sham tDCS significantly improved visual-spatial working memory. No effects were found on clinical symptoms or other cognitive measures. We will present data from our target sample of 40 boys at the conference.

**Conclusion:** Although preliminary, our findings hint that a promising tool for improving cognitive deficits in boys with ADHD could be multiple sessions of anodal tDCS combined with cognitive training applied to the rIFC. Keywords: ADHD treatment, tDCS, RCT, improvement

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Can J Psychiatry. 2018.

**TRAFFIC VIOLATIONS AMONG YOUNG PEOPLE WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER.**

**Ferro MA, Leatherdale ST.**

**Background:** Evidence whether individuals with attention-deficit hyperactivity disorder (ADHD) are at increased risk for traffic violations/collisions is mixed. This study investigated the association between ADHD and traffic violations among youth and young adults; examined whether this association differed by age, sex, or comorbid mental or physical problems; and modelled factors associated with traffic violations among individuals with ADHD.

**Methods:** Data come from the 2012 Canadian Community Health Survey Mental Health (CCHS-MH), a cross-sectional epidemiological study. The sample was restricted to youth and young adults aged 15 to 39 years and categorized into 3 groups: 15 to 19 years (n = 1886), 20 to 29 years (n = 3679), and 30 to 39 years (n = 3659). Lifetime ADHD and past-year contact with police for traffic violations were self-reported. Logistic regression models quantified the association between ADHD and traffic violations, stratified by age. Interactions were included to examine moderating effects.

**Results:** No evidence suggested an association between ADHD and past-year traffic violations (odds ratio [OR], 1.07; 95% confidence interval (CI), 0.64 to 1.79), age-specific estimates did not differ across age groups (P = 0.696), and no factors moderated the association. Three factors were found to increase odds for past-year traffic violations among individuals with ADHD: aged 20 to 29 years (OR, 3.84; 95% CI, 1.47 to 10.06), male sex (OR, 3.48; 95% CI, 1.39 to 8.59), and white ethnicity (OR, 5.62; 95% CI, 1.24 to 25.51).

**Conclusions:** Individuals with ADHD are not an at-risk group for traffic violations but instead share similar risk factors with individuals in the general population without ADHD information useful for health professionals. Replication studies are needed to examine the robustness of these findings

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Clin EEG Neurosci. 2018.

**ENTROPY-BASED QUANTITATIVE ELECTROENCEPHALOGRAM ANALYSIS FOR DIAGNOSING ATTENTION-DEFICIT HYPERACTIVITY DISORDER IN GIRLS.**

**Chow JC, Ouyang C-S, Tsai C-L, et al.**

Diagnosis of attention-deficit hyperactivity disorder (ADHD) is currently based on core symptoms or checklists; however, the inevitability of practitioner subjectivity leads to over- and underdiagnosis. Although the Federal Drug Administration has approved an elevated theta/beta ratio (TBR) of the electroencephalogram (EEG) band as a tool for assisting ADHD diagnosis, several studies have reported no significant differences of the TBR between ADHD and control subjects. This study detailed the development of a method based on approximate entropy (ApEn) analysis of EEG to compare ADHD and control groups. Differences between ADHD presentation in boys and girls indicate the necessity of separate investigations. This study enrolled 30 girls with ADHD and 30 age-matched controls. The results revealed significantly higher ApEn values in most brain areas in the control group than in the ADHD group. Compared with TBR-related feature descriptors, ApEn-related feature descriptors can produce the higher average true positive rate (0.846), average true negative rate (0.814), average accuracy (0.817), and average area under the receiver operating characteristic curve value (0.862). Therefore, compared with TBR, ApEn possessed the better potential for differentiating between girls with ADHD and controls

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Clin EEG Neurosci. 2018.

**EEG NEUROFEEDBACK TRAINING IN CHILDREN WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER: A COGNITIVE AND BEHAVIORAL OUTCOME STUDY.**

**Shereena EA, Gupta RK, Bennett CN, et al.**

**Background.** Attention deficit/hyperactivity disorder (ADHD) is a highly prevalent childhood disorder with symptoms of inattention, impulsivity, and hyperactivity. EEG neurofeedback training (NFT) is a new intervention modality based on operant conditioning of brain activity, which helps reduce symptoms of ADHD in children.

**Methods and Procedures.** To examine the efficacy of NFT in children with ADHD, an experimental longitudinal design with pre-post comparison was adopted. A total of 30 children in the age range of 6 to 12 years diagnosed as ADHD with or without comorbid conditions were assigned to treatment group (TG; n = 15) and treatment as usual group (TAU; n = 15). TG received EEG-NFT along with routine clinical management and TAU received routine clinical management alone. Forty sessions of theta/beta NFT at the C3 scalp location, 3 to 4 sessions in a week for a period of 3.5 to 5 months were given to children in TG. Children were screened using sociodemographic data and Binet-Kamat test of intelligence. Pre-and postassessment tools were neuropsychological tests and behavioral scales. Follow-up was carried out on 8 children in TG using parent-rated behavioral measures.

**Results.** Improvement was reported in TG on cognitive functions (sustained attention, verbal working memory, and response inhibition), parent- and teacher-rated behavior problems and on academic performance rated by teachers. Follow-up of children who received NFT showed sustained improvement in ADHD symptoms when assessed 6 months after receiving NFT.

**Conclusion.** The present study suggests that NFT is an effective method to enhance cognitive deficits and helps reduce ADHD symptoms and behavior problems. Consequently, academic performance was found to be improved in children with ADHD. Improvement in ADHD symptoms induced by NFT were maintained at 6-month follow-up in children with ADHD

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Clin Psychol Rev. 2019.

**SOCIAL FUNCTIONING IN YOUTH WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND AUTISM SPECTRUM DISORDER: TRANSDIAGNOSTIC COMMONALITIES AND DIFFERENCES.**

**Mikami AY, Miller M, Lerner MD.**

Attention-Deficit/Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD) are both neurodevelopmental disorders originating in childhood with high associated impairments and public health significance. There has been growing recognition of the frequent co-occurrence, and potential interrelatedness, between ADHD and ASD without intellectual disability. In fact, the most recent (5th) edition of the DSM is the first to allow ADHD and ASD to be diagnosed in the same individual. The study of transdiagnostic features in ADHD and ASD is important for understanding, and treating, these commonly co-occurring disorders. Social impairment is central to the description and prognosis of both disorders, and many youth with some combination of ADHD and ASD present to clinics for social skills training interventions. However, the aspects of social functioning that are impaired may have both shared and distinct features between the two disorders, relating to some overlapping and some diverse etiologies of social problems in ADHD compared to ASD. These findings have implications for interventions to address social problems in youth with these conditions. We conclude with a discussion about areas for future research and novel intervention targets in youth with ADHD, ASD, and their comorbidity

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Cogent Medicine. 2018;5:5-6.

**EFFECT OF TREADMILL TRAINING ON EXECUTIVE FUNCTION BEHAVIORS AND QUALITY OF LIFE IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.**

**Durgut E, Cahid A, Candan AZ.**

**Introduction:** Attention deficit hyperactivity disorder (ADHD) is a childhood-onset neurodevelopmental disorder characterized by developmentally inappropriate and impairing inattention, motor hyperactivity and impulsivity, with difficulties often continuing into adulthood (1). It is reported in the literature that children with ADHD may have executive function deficits, behavioral disorders and motor impairments. Furthermore, studies have shown that exercise, such as acute and chronic aerobic exercises improves executive functions and motor abilities and so it is hypothesized that exercise may have a potential or additional treatment option for children with ADHD.

**Purpose:** The literature emphasizes the importance of physical activity in children with ADHD, but there is no clarity regarding the frequency, intensity or duration of the exercise. Thus, the aim of this study was to investigate the effects of treadmill training as an aerobic exercise on executive functions and quality of life in children with ADHD.

**Materials and Methods:** A total of 15 subjects aged between 7 and 11 years who are diagnosed with ADHD received treadmill training for 8 weeks, 3 days per week and each session for 45 min. Assessments were applied before the beginning of the training program and at the end of 8th week. Executive function behaviors in the school and home environments of subjects were evaluated with Behaviour Rating Inventory of Executive Function (BRIEF)-Parents and Teacher Form; quality of life with the Pediatric Quality of Life Inventory (PedsQL)-Children and Parents Form. Statistical analyses performed using SPSS version 20 (SPSS Inc.,USA) and used paired samples t-test to compare the differences.

**Results:** At the end of the training program, all the assessment results improved significantly in both groups ( $p < 0.05$ ).

**Conclusion:** This study showed that exercise training may be a beneficial treatment approach for children with ADHD

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Cogent Medicine. 2018;5:2.

**SLEEP HABITS IN CHILDREN WITH ADHD AND THE EFFECTS OF MEDICATION.**

**Adriano M, Guardiano M, Rocha S, et al.**

**Introduction:** Sleep disturbances are known to correlate with attention deficit hyperactivity disorder (ADHD). This association is most likely bidirectional-ADHD may affect the sleep pattern and disrupted sleep may exacerbate ADHD executive dysfunction. Additionally, sleep is thought to be affected by ADHD medication, although the frequency and extent of this interaction are not well defined.

**Purpose:** To characterize the influence of ADHD medication on sleep in children and adolescents.

**Material and Methods:** A cross-sectional multicentric study was accomplished using a pretested questionnaire, adapted from the Children's Sleep Habits Questionnaire, in order to assess sleep habits in a pediatric population medicated for ADHD. The participants were enrolled in neurodevelopmental pediatrics appointments. Data were analyzed using IBM SPSS statistical software, version 25.

**Results:** This study included 195 children and adolescents with ADHD. The average age was 11.3 years old (SD 2.7, range 6-17) and 75.4% ( $n = 147$ ) were male. Concerning sleeping habits, 20% ( $n = 39$ ) usually resist to go to bed, 18.5% ( $n = 36$ ) usually need another person in the room to fall asleep, 28.7% ( $n = 56$ ) usually fall asleep watching TV or other electronic devices and 52.8% ( $n = 103$ ) take more than 30 min to fall asleep. In the morning, 35.4% ( $n = 69$ ) usually show difficulty getting out of the bed and 15.5% ( $n = 30$ ) usually look or feel tired. Most of children (94.9%,  $n = 185$ ) were medicated with methylphenidate. Regarding its dosage, 13.5% ( $n = 25$ ) were treated with less than 0.5 mg/kg/day, 72.4% ( $n = 134$ ) between 0.5 and 1 mg/kg/day and 14.1% ( $n = 26$ ) over 1 mg/kg/day. The majority did not take medication on weekends. When using medication, most children reported no differences concerning the time when they felt sleepy at night (85.0%), the time to fall asleep (84.4%) or the number of nocturnal awakenings (90.7%).

**Conclusion:** This study suggests that methylphenidate does not affect the sleep pattern in most children and adolescents. The high prevalence of behavioral sleep problems in children and adolescents with ADHD reinforce the need to continually address these issues in follow-up appointments

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Dev Med Child Neurol. 2019.

**ADAPTIVE FUNCTIONING IN CHILDREN WITH NEUROFIBROMATOSIS TYPE 1: RELATIONSHIP TO COGNITION, BEHAVIOR, AND MAGNETIC RESONANCE IMAGING.**

**Eby NS, Griffith JL, Gutmann DH, et al.**

**Aim:** To characterize the adaptive behavior profile of children with neurofibromatosis type 1 (NF1) and determine its relationship to neuropsychological functioning and non-neoplastic T2-weighted hyperintense brain lesions on brain magnetic resonance imaging (MRI).

**Method:** In this cross-sectional study, we retrospectively reviewed neuropsychological reports from 104 children with NF1 (56 males, 48 females; mean age 10y 4mo; standard deviation [SD] 3y 4mo; range 3y 5mo 17y 6mo), and extracted data from a range of cognitive and behavioral measures, including the Adaptive Behavior Assessment System (ABAS). Brain MRI was retrospectively reviewed in 42 individuals.

**Results:** Adaptive Behavior Assessment System scores were continuously distributed and pathologically shifted by 0.79 to 1.26SD across Conceptual, Social, and Practical domains, and 46.5% of individuals had a composite score in the borderline or impaired range. Impairment in adaptive functioning was correlated with deficits in executive function ( $r=9.543$ ,  $p<0.001$ ), externalizing problems ( $r=0.366$ ,  $p<0.001$ ), and attention ( $r=9.467$ ,  $p=0.001$ ). Cluster analysis revealed three distinct phenotypic subgroups, one of which exhibited normal cognitive ability, but impaired adaptive functioning, with persistent deficits in executive function, behavioral problems, and attention-deficit/hyperactivity disorder symptomatology. There was no relationship between ABAS scores and the number or location of unidentified bright objects.

**Interpretation:** Adaptive functioning deficits are common among children with NF1 and are associated with impairment in other cognitive/behavioral domains, independent of general cognitive ability. What this paper adds: Deficits in adaptive behavior are common in children with neurofibromatosis type 1 (NF1). Poor adaptive functioning is associated with impairments in executive function, externalizing behaviors, and attention, regardless of cognitive ability. The presence or location of unidentified bright objects do not predict adaptive behavior skills in children with NF1

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Dev Neurorehabilitation. 2019.

**EFFECTS OF DEXMETHYLPHENIDATE ON TARGETED AND NON-TARGETED BEHAVIOURS DURING FUNCTIONAL ANALYSES: A BRIEF REPORT.**

**Torelli JN, Lambert JM, Francis RN, et al.**

**Objective:** This study evaluated the effects of dexamethylphenidate on problem behavior during functional analyses conducted across dexamethylphenidate and placebo conditions for a child with multiple disabilities.

**Methods:** We conducted functional analyses in a multielement format embedded in a withdrawal design and collected data on the frequency of disruptive behavior and duration of crying.

**Results:** Results suggest disruptive behaviour was maintained by attention when DMPH was absent, but not when it was present. Results also suggest DMPH may have had collateral effects on the probability of non-targeted behaviour (crying). Consistent with previous research, functional analyses exhibited a change in disruptive behaviour's function between medication and placebo conditions.

**Conclusion:** These findings provide further support that stimulant medication may change the function of disruptive behavior and highlight the need to investigate the effects of stimulants on non-targeted behaviors

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Emergency Medicine International. 2018;2018.

**Prevalence of Attention Deficit Hyperactivity Disorder Symptoms in Children Who Were Treated at EMERGENCY SERVICE DUE TO UNINTENTIONAL INJURY.**

**Iz M, Ceri V.**

**Aim.** Attention Deficit Hyperactivity Disorder (ADHD) is a developmental disorder characterized by severe inattention, hyperactivity, and impulsivity. This research aims to determine the frequency of ADHD symptoms in children who were treated in emergency paediatric services due to unintentional injuries.

**Method.** This study was carried out with children who were treated due to unintentional injuries in an Emergency Department. ADHD symptoms were evaluated using the DSM-IV-based Screening and Assessment Scale for Behavioural Disorders in Children and Adolescents.

**Results.** The study sample consisted of 89 girls (40.1%) and 133 boys (59.9%) - a total of 222 children. The participants ranged from 5 to 18 years of age, and the mean age was found to be 11.5-13 years. According to medical evaluations, the most common diagnosis for the unintentional injuries was soft tissue trauma (41.9%). The mean ADHD and ODD (Oppositional Defiant Disorder) scores of our study sample were, respectively, 19.9-112 and 7.7-15.7. The prevalence of children with possible ADHD was as high as 81.6% (179) and, for ODD, was 62.6% (139), according to cut-off values.

**Conclusion.** Our results pointed out very high levels of ADHD and ODD symptoms among children who were treated at emergency services for accidental injuries. Appropriately screening for ADHD in children with accidental injuries and referring them to child psychiatry units may prevent later accidents and injuries

Emot Behav Difficulties. 2019.

**BOYS' SOCIALISATION AND AGENCY IN A SWEDISH SPECIAL EDUCATIONAL NEEDS UNIT.**

**Karlsson Y.**

The overall aim of this article is to analyse how a school's special needs unit in Sweden deals with children's agency and category work as they negotiate and categorise the problems that are encountered there. The data derive from an ethnographic study conducted in a Swedish special educational needs unit (SENU) attended by a group of five boys aged between 7 and 12. The results show that the teachers' categorisations of the boys' emotional and behaviour problems and attention-deficit/hyperactivity disorder (ADHD) could be interpreted as an attempt to guide the boys' development so that they will change and improve. Conversely, from the boys' perspectives, the daily activities in the SENU could themselves be problematic in that the boys are obliged to adopt several different strategies to control and strengthen their identity. These observations highlight the importance of detailed analyses of the boys' communicative activities during their interactions with teachers and peers

Environ Res. 2019;398-405.

**PRENATAL BISPHENOL A EXPOSURE IS ASSOCIATED WITH LANGUAGE DEVELOPMENT BUT NOT WITH ADHD-RELATED BEHAVIOR IN TODDLERS FROM THE ODENSE CHILD COHORT.**

**Jensen TK, Mustieles V, Bleses D, et al.**

Bisphenol A (BPA) is a non-persistent chemical with endocrine disrupting abilities widely used in a variety of consumer products. The fetal brain is particularly sensitive to chemical exposures due to its rapid growth and complexity. Some studies have reported association between maternal BPA exposure and behavior but few have assessed impact on cognitive development, and to our knowledge no studies have specifically assessed the impact on language development. We therefore assessed whether maternal urinary BPA concentration during pregnancy was associated with language development and attention-deficit and hyperactivity disorder (ADHD) symptoms in offspring aged 18-36 months in the prospective Odense Child Cohort. BPA was analyzed in 3rd trimester maternal fasting urine spot samples. Language development was addressed among 535 children using the Danish adaptation of the MacArthur-Bates Communicative Development Inventories at median age 21 months; ADHD traits were assessed by parents of 658 children using the Child Behavior Checklist for ages 1-5 years at mean age 2.7 years. Associations were assessed

using logistic regression models comparing children below the 15th percentile score for language and above the 85th percentile score for ADHD with the other children while stratifying by sex and adjusting for maternal education, duration of breastfeeding and maternal urine phthalates. BPA was detected in 85.3% of the urine samples (median 1.2 ng/ml). Boys of mothers with BPA exposure in the highest tertile had an odds ratio of 3.70 (95% CI 1.34–10.21) of being in the lowest 15th percentile of vocabulary score compared to boys of mothers within the lowest tertile of BPA exposure after adjustment, whereas no association was found in girls. No clear dose-response relationship between maternal BPA and ADHD scores above the 85th percentile was found for either sex. Since early language development is a predictor of future reading skills and educational success, more epidemiological studies assessing BPA exposure and language skills are needed to confirm our findings

Epidemiology. 2018;29:618-22.

**AIR POLLUTION EXPOSURE DURING PREGNANCY AND SYMPTOMS OF ATTENTION DEFICIT AND HYPERACTIVITY DISORDER IN CHILDREN IN EUROPE.**

**Forns J, Sunyer J, Garcia-Esteban R, et al.**

**Background:** Exposure to air pollution during pregnancy may increase attention-deficit/hyperactivity disorder (ADHD) symptoms in children, but findings have been inconsistent. We aimed to study this association in a collaborative study of eight European population-based birth/child cohorts, including 29,127 mother-child pairs.

**Methods:** Air pollution concentrations (nitrogen dioxide [NO<sub>2</sub>] and particulate matter [PM]) were estimated at the birth address by land-use regression models based on monitoring campaigns performed between 2008 and 2011. We extrapolated concentrations back in time to exact pregnancy periods. Teachers or parents assessed ADHD symptoms at 3-10 years of age. We classified children as having ADHD symptoms within the borderline/clinical range and within the clinical range using validated cutoffs. We combined all adjusted area-specific effect estimates using random-effects meta-analysis and multiple imputations and applied inverse probability-weighting methods to correct for loss to follow-up.

**Results:** We classified a total of 2,801 children as having ADHD symptoms within the borderline/clinical range, and 1,590 within the clinical range. Exposure to air pollution during pregnancy was not associated with a higher odds of ADHD symptoms within the borderline/clinical range (e.g., adjusted odds ratio [OR] for ADHD symptoms of 0.95, 95% confidence interval [CI] = 0.89, 1.01 per 10 µg/m<sup>3</sup> increase in NO<sub>2</sub> and 0.98, 95% CI = 0.80, 1.19 per 5 µg/m<sup>3</sup> increase in PM<sub>2.5</sub>). We observed similar associations for ADHD within the clinical range.

**Conclusions:** There was no evidence for an increase in risk of ADHD symptoms with increasing prenatal air pollution levels in children aged 3-10 years

Eur Child Adolesc Psychiatry. 2019.

**SLOW CORTICAL POTENTIALS NEUROFEEDBACK IN CHILDREN WITH ADHD: COMORBIDITY, SELF-REGULATION AND CLINICAL OUTCOMES 6-MONTHS AFTER TREATMENT IN A MULTICENTER RANDOMIZED CONTROLLED TRIAL.**

**Aggensteiner P-M, Brandeis D, Millenet S, et al.**

Despite sizeable short-term effects of neurofeedback (NF) therapy on attention-deficit and hyperactivity disorder (ADHD), longer-term clinical, comorbidity and self-regulation outcomes are less systematically studied. The aim of this largest NF follow-up to date was to evaluate these outcomes 6-months after NF compared to a semi-active control to disentangle specific from unspecific sustained effects. We performed a multicenter, randomized, parallel, controlled, clinical, superiority trial in five German university outpatient departments. Participants were eligible if they fulfilled DSM-IV-TR criteria for ADHD and were aged from 7 to 9-years. Participants were randomly assigned (1:1-ratio) to 25 sessions of slow cortical potential (SCP)-NF or electromyogram biofeedback (EMG-BF). Participants were not blinded, since they received instructions according to each treatment setting. Primary outcomes were parent ratings of ADHD. The trial was registered, number ISRCTN761871859. Both groups showed improvement of ADHD symptoms compared

to baseline at 6-months follow-up with large effect sizes for SCP-NF ( $d = 1.04$ ) and EMG-BF ( $d = 0.85$ ), but without group differences. When analyzing all assessments (pre-test, post-test-1, post-test-2 and follow-up), a group-by-time interaction emerged ( $p = 0.0062$ ), with SCP-NF showing stable improvement following treatment but EMG-BF showing a relapse from post-test-1 to post-test-2, and subsequent remission at follow-up. Six months after the end of treatment, improvement after SCP-NF remained large and stable. However, the lack of group differences at follow-up suggests shared specific and unspecific effects contributing to this clinical outcome. Our correlational results indicate specificity of SCP-NF for selected subscales after training, but not at follow-up

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Frontiers in Behavioral Neuroscience. 2018;12.

**RESTING-STATE DEFAULT MODE NETWORK RELATED FUNCTIONAL CONNECTIVITY IS ASSOCIATED WITH SUSTAINED ATTENTION DEFICITS IN SCHIZOPHRENIA AND OBSESSIVE-COMPULSIVE DISORDER.**

**Fan J, Gan J, Liu W, et al.**

**Background:** Previous studies have indicated the resting-state default mode network (DMN) related connectivity serving as predictor of sustained attention performance in healthy people. Interestingly, sustained attention deficits as well as DMN-involved functional connectivity (FC) alterations are common in both patients with schizophrenia (SCZ) and with obsessive-compulsive disorder (OCD). Thus, the present study was designed to investigate whether the DMN related resting-state connectivity alterations in these two psychiatric disorders were neural correlates of their sustained attention impairments.

**Methods:** The study included 17 SCZ patients, 35 OCD patients and 36 healthy controls (HCs). Sustained attention to response task was adopted to assess the sustained attention. Resting-state scan was administrated and seed-based whole-brain FC analyses were performed with seeds located in classical DMN regions including bilateral medial prefrontal cortex (mPFC) and posterior cingulate cortex (PCC).

**Results:** Both SCZ and OCD patients had poorer sustained attention than HCs. Sustained attention deficits in OCD was negatively correlated with their impaired FC of right mPFC-left superior frontal gyrus (SFG) within DMN, and that in SCZ was significantly correlated with their altered FC of left mPFC-bilateral anterior cingulate cortex (ACC) which indicated interaction between DMN and salience network. In addition, the FC between left mPFC and right parietal lobe indicating the interaction between DMN and frontal-parietal network was correlated with sustained attention in both SCZ and OCD.

**Conclusion:** These findings suggest the importance of DMN-involved connectivity, both within and between networks in underlying sustained attention deficits in OCD and SCZ. Results further support the potential of resting-state FC in complementing information for cognitive deficits in psychiatric disorders

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Front Psychol. 2018 Dec;9.

**AUDITORY AND VISUAL STATISTICAL LEARNING ARE NOT RELATED TO ADHD SYMPTOMATOLOGY: EVIDENCE FROM A RESEARCH DOMAIN CRITERIA (RDoC) APPROACH.**

**Parks KMA, Stevenson RA.**

Statistical learning is an implicit process that allows individuals to track and predict incoming events from their environment. Given that information is highly structured over time, events become predictable, allowing these individuals to make better sense of their environment. Among the studies that have examined statistical learning in attention deficit/hyperactivity disorder (ADHD), findings have been mixed. Our goal was to examine whether increased ADHD symptomatology related to decreased auditory and visual statistical learning abilities. To investigate this, we examined the entire range of ADHD symptomatology using a Research Domain Criteria approach with a clinically reliable questionnaire in addition to well-established auditory and visual statistical learning paradigms. Total ADHD symptomatology was not related to auditory and visual statistical learning. An identical pattern emerged when inattention and hyperactivity components were separated, indicating that neither of these distinct behavioral symptoms of ADHD are related to statistical learning abilities. Findings from the current study converge with other studies but go beyond finding a lack of a significant relationship—through Bayesian analyses, these data provide novel evidence directly



supporting the hypothesis that ADHD symptomatology and statistical learning are decoupled. This finding held for overall levels of ADHD symptomatology as well as the subdomains of inattention and hyperactivity, suggesting that the ability to pick up on patterns in both auditory and visual domains is intact in ADHD. Future work should consider investigating statistical learning in ADHD across ages and beyond auditory and visual domains

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Int J Clin Pract. 2019 Jan;73:e13260.

**ESTABLISHING US NORMS FOR THE ADULT ADHD SELF-REPORT SCALE (ASRS-v1.1) AND CHARACTERISING SYMPTOM BURDEN AMONG ADULTS WITH SELF-REPORTED ADHD.**

**Adler LA, Faraone SV, Sarocco P, et al.**

**AIMS:** To estimate Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist normative total scores among the US adult general population and to evaluate overall attention-deficit hyperactivity disorder (ADHD) symptom burden among US adults with ADHD.

**METHODS:** Prior 2012 and 2013 US National Health and Wellness Survey respondents were re-contacted. Demographics, comorbidities, and ASRS-v1.1 data were collected. ASRS-v1.1 scores were compared by sex, age, ADHD diagnosis, and ADHD medication use. Group differences were evaluated using chi-square tests and independent samples t-tests for categorical and continuous variables, respectively.

**RESULTS:** Of 22 397 respondents, 465 self-reported being diagnosed with ADHD by a physician; of these, 174 self-reported using ADHD medication. The mean ASRS-v1.1 total score was 2.0 (SD = 3.2); scores differed by age and sex (all,  $P < 0.001$ ). ADHD (vs no ADHD) was associated with depression (58.1% vs 18.0%), anxiety (53.1% vs 16.0%), and sleep difficulties (37.0% vs 14.0%) (all,  $P < 0.001$ ). ADHD medication use (vs no use) was associated with depression (68.4% vs 51.9%), anxiety (67.2% vs 44.7%), panic disorder (25.9% vs 17.2%), and insomnia (27.6% vs 19.6%) (all,  $P < 0.05$ ). ADHD (vs no ADHD) respondents scored higher on all 18 ASRS-v1.1 items (all,  $P < 0.05$ ). Medication users (vs non-users) scored higher on six items (all,  $P < 0.05$ ).

**DISCUSSION:** Adult ADHD may be undertreated or sub-optimally treated, despite a high symptom burden. Normative data will allow comparisons with individuals' scores to support the assessment of ADHD symptom burden among adults. **CONCLUSION:** Findings highlight the importance of assessing ADHD symptom burden, especially among adults presenting with comorbidities

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Int J Psychiatry Clin Pract. 2019.

**LONG-TERM CARDIOVASCULAR SAFETY OF PSYCHOSTIMULANTS IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.**

**Conzelmann A, et al.**

**Objective:** Side effects are a concern during psychostimulant treatment. Unfortunately, many previous studies only investigated short-term effects of psychostimulants in laboratory settings which lack clinical daily routines.

**Methods:** We examined 1042 patient records of patients with attention deficit hyperactivity disorder (ADHD) who were referred to a pediatric-psychiatry practice over 12 years. Data analysis was based on 466 children with ADHD who were newly treated with psychostimulants and who were not in treatment for elevated blood pressure. We analysed blood pressure percentiles, heart rate and BMI percentiles.

**Results:** There was a decrease in systolic and diastolic blood pressure percentiles. Heart rate was not affected. BMI slightly declined in girls.

**Conclusions:** In general psychostimulants were safe. To further elucidate negative effects of psychostimulants, long-term controlled and randomized studies in naturalistic settings are of interest

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Iran J Child Neurol. 2015;9:48-53.

**THE RELATIONSHIP BETWEEN SERUM VITAMIN D LEVEL AND ATTENTION DEFICIT HYPERACTIVITY DISORDER.**

**Sharif MR, Madani M, Tabatabaei F, et al.**

**Objective** Attention deficit hyperactivity disorder (ADHD) is one of the most prevalent mental health disorders. In recent years, the impacts of various micronutrients on ADHD have been studied. However, vitamin D has received much less attention. This study was aimed at evaluating the association and level of serum vitamin D in children with ADHD.

**Materials & Methods** This case-control study was carried out, in 2012, on 6 to 12 yr-old children. Thirty-seven were children with ADHD in the cases group and another 37 healthy children were in the control group. Venous blood sample was drawn from each child to measure the serum level of vitamin D. Other variables were compared as well.

**Results** The mean serum vitamin D level of children with ADHD (19.11-10.10 ng/ml) was significantly lower than that of the control group (28.67-113.76 ng/ml) ( $P < 0.001$ ).

**Conclusion** Deficiency of vitamin D has been proved in various psychiatric diseases. This study evidenced a significantly low level of serum vitamin D in children with ADHD. This suggests the need for regularly monitoring of serum vitamin D levels and treatment of patients with vitamin D deficiencies

J Abnorm Child Psychol. 2018 Nov;46:1585-98.

**CHILDREN'S REWARD AND PUNISHMENT SENSITIVITY MODERATES THE ASSOCIATION OF NEGATIVE AND POSITIVE PARENTING BEHAVIORS IN CHILD ADHD SYMPTOMS.**

**Li JJ.**

Atypical reward processing, including abnormal reward responsivity and sensitivity to punishment, has long been implicated in the etiology of ADHD. However, little is known about how these facets of behavior interact with positive (e.g., warmth, praise) and negative (e.g., hostility, harsh discipline) parenting behavior in the early expression of ADHD symptoms in young children. Understanding the interplay between children's reward processing and parenting may be crucial for identifying specific treatment targets in psychosocial interventions for ADHD, especially given that not all children benefit from contingency-based treatments (e.g., parent management training). The study consisted of a sample of kindergarten children ( $N = 201$ , 55% male) and their parents, who completed questionnaires about their parenting practices, their child's behaviors and participated in an observed parent-child play task in the laboratory. Children's reward responsivity and sensitivity to punishment were positively associated with child ADHD symptoms. However, children with high reward responsivity had more symptoms of ADHD but only under conditions of low negative parenting (self-reported and observed) and high self-reported positive parenting, compared to children with low reward responsivity. Children with high sensitivity to punishment had more ADHD symptoms relative to children with low sensitivity to punishment, but only under conditions in which observed praise was infrequent. Results provide evidence that individual differences in sensitivity to reward/punishment may be an important marker of risk for ADHD, but also highlights how children's responses to positive and negative parenting behavior may vary by children's sensitivities. Clinical and treatment implications are discussed

J Abnorm Child Psychol. 2018 Nov;46:1705-16.

**OVERLAPPING AND DISTINCT COGNITIVE IMPAIRMENTS IN ATTENTION-DEFICIT/HYPERACTIVITY AND AUTISM SPECTRUM DISORDER WITHOUT INTELLECTUAL DISABILITY.**

**Karalunas SL, Hawkey E, Gustafsson H, et al.**

Attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) are commonly comorbid, share genetic liability, and often exhibit overlapping cognitive impairments. Clarification of shared and distinct cognitive effects while considering comorbid symptoms across disorders has been lacking. In the current study, children ages 7–15 years assigned to three diagnostic groups: ADHD ( $n = 509$ ), ASD ( $n = 97$ ), and controls ( $n = 301$ ) completed measures spanning the cognitive domains of attention/arousal, working memory, set-shifting, inhibition, and response variability. Specific processes contributing to response

variability were examined using a drift diffusion model, which separately quantified drift rate (i.e., efficiency of information processing), boundary separation (i.e., speed-accuracy trade-offs), and non-decision time. Children with ADHD and ASD were impaired on attention/arousal, processing speed, working memory, and response inhibition, but did not differ from controls on measures of delayed reward discounting, set-shifting, or interference control. Overall, impairments in the ASD group were not attributable to ADHD symptoms using either continuous symptom measures or latent categorical grouping approaches. Similarly, impairments in the ADHD group were not attributable to ASD symptoms. When specific RT parameters were considered, children with ADHD and ASD shared impairments in drift rate. However, children with ASD were uniquely characterized by a wider boundary separation. Findings suggest a combination of overlapping and unique patterns of cognitive impairment for children with ASD as compared to those with ADHD, particularly when the processes underlying reaction time measures are considered separately

J Adolesc Health. 2019;64:S67.

**GENDER DIFFERENCE IN THE CORRELATION BETWEEN ATTENTION DEFICIT/HYPERACTIVITY SYMPTOMS AND RISK BEHAVIORS AMONG TAIWANESE YOUTH.**

**Lee C-T, Tsai M-C.**

**Purpose:** Despite that attention deficit/hyperactivity (ADHD) symptoms may resolve with age, research regarding ADHD symptoms in the Taiwanese young population is relatively scarce. The current study is to examine the gender difference in the correlation between ADHD symptoms and risk behavior profiles among Taiwanese youth

**Methods:** We enrolled individuals aged 15-22 years from the clinical setting and the nearby communities, while those with psychiatric or major physical illness were excluded. ADHD symptoms were measured using adult ADHD self-report scale and risk behaviors measured using youth health behavior checklist. Gender-stratified relationship between ADHD symptoms and risk behaviors was examined with ANOVA, correlation and regression analyses.

**Results:** A total of 493 enrollees aged 19.1 (-1.45) years with 258 (51.6%) males were included in the analysis. In females, ADHD scores were associated with stealing (odds ratio 1.22, [95% confidence interval 1.04, 1.43]), breaking properties (1.24 [1.01, 1.53]), and cigarette smoking (1.24 [1.04, 1.47]). In males, ADHD scores were associated with alcohol drinking (1.07 [1.01, 1.15]), involving in physical fights (1.18 [1.05, 1.33]).

**Conclusions:** Gender difference was noted in the correlation between ADHD symptoms and youth risk behaviors. Clinicians should be aware of underdiagnosed ADHD provide appropriate interventions in youth with risk behaviors.

**Sources of Support:** This study was supported by the research grant from the National Cheng Kung University Hospital (NCKUH-10702001) and the Ministry of Science and Technology, Taiwan (MOST 105-2628-B-006 -010 -MY3)

J Affective Disord. 2019;246:754-62.

**COMORBID DISORDERS AS MODERATORS OF RESPONSE TO FAMILY INTERVENTIONS AMONG ADOLESCENTS WITH BIPOLAR DISORDER.**

**Weintraub MJ, Axelson DA, Kowatch RA, et al.**

**Background:** While family interventions have shown efficacy in improving mood symptoms and family functioning in pediatric bipolar disorder, few studies have examined the effects of comorbid psychiatric conditions on patients symptomatic or functional responses to treatment.

**Methods:** 145 adolescents with bipolar I or II disorder were randomly assigned to family-focused therapy (FFT-A) or a brief psychoeducational therapy (enhanced care; EC) and followed over 2 years. Participants received pharmacotherapy for the study's duration. We examined whether comorbid anxiety disorders, attention-deficit/hyperactivity disorder (ADHD), and disruptive behavior disorders (DBDs; i.e., oppositional defiant and conduct disorder) predicted the proportion of weeks that participants experienced mood

symptoms during follow-up, and whether comorbid disorders moderated the effects of treatment assignment on mood symptoms and family conflict.

**Results:** Comorbid anxiety was associated with a greater proportion of weeks with depressive symptoms, more severe (hypo)manic symptoms during follow-up, and greater family conflict over the 2-year study. Comorbid ADHD was associated with a greater proportion of weeks with (hypo)manic symptoms, more severe (hypo)manic symptoms, and greater family conflict. Additionally, youth with comorbid ADHD who received FFT-A had more favorable trajectories of (hypo)manic symptoms and family functioning than youth with comorbid ADHD who received EC. Comorbid DBDs were consistently associated with more severe depressive symptoms and greater family conflict throughout the study.

**Limitations:** Randomization to treatments was not stratified on comorbid disorders. The longitudinal trajectories of anxiety, attentional, and disruptive behavior symptoms were not examined.

**Conclusions:** The course of bipolar disorder in adolescents is strongly affected by comorbid disorders. Future research should examine whether adolescents with more complex presentations of bipolar disorder should be treated with different or more intensive psychosocial protocols than adolescents without these presentations

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J Autism Dev Disord. 2019.

**A GAME-BASED REPEATED ASSESSMENT FOR COGNITIVE MONITORING: INITIAL USABILITY AND ADHERENCE STUDY IN A SUMMER CAMP SETTING.**

**Flynn RM, et al.**

The current feasibility study examined the adherence, reliability, and assessment potential of an evidence-based game-like mobile Monitoring Tool (Akili Interactive Labs), to monitor 100 participants' cognition for eight sessions at a summer camp for children with special needs. A validated measure of attention was administered at baseline. In the last session, participants completed an exit questionnaire. The Monitoring Tool was found to be enjoyable, and showed a high rate of adherence. No Monitor-related adverse events were reported. Monitor metrics showed good reliability across repeated measurements, indicating it is stable over long-term cognitive monitoring. There was evidence that the Monitoring Tool was able to detect differences in cognition between the children diagnosed with attention deficit hyperactivity disorder and autism spectrum disorders

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J Child Neurol. 2019;34:61-67.

**SERUM INTERLEUKIN-6 LEVEL IN CHILDREN WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD).**

**Darwish AH, Elgohary TM, Nosair NA.**

**Introduction:** Attention-deficit hyperactivity disorder (ADHD) is a common neurobehavioral disorder in children, but its specific etiology and pathophysiology are still incompletely understood.

**Objectives:** This case-control study aimed to measure the level of serum interleukin-6 (IL-6) as a predictor of the immunologic status in children with ADHD, and to study its correlation with severity of symptoms.

**Subjects and Methods:** 60 ADHD children who met the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, criteria for ADHD and 60 control children were subjected to complete history taking, clinical examination, and psychometric tests. Serum interleukin-6 of ADHD patients and control children was measured by enzyme-linked immunosorbent assay.

**Results:** The mean serum level of IL-6 was 22.35 (95% confidence interval [CI], 17.68-26.99) in ADHD patients, and it was 5.44 (95% CI, 4.81-6.06) in controls. A significantly higher level of IL-6 was reported in ADHD patients compared with controls ( $P = .001$ ). No significant correlation was found between serum IL-6 level and either the Intelligence Quotient (IQ) or the Conners Parent Rating Scale score.

**Conclusion:** Serum IL-6 values were significantly higher in ADHD patients compared to healthy control children. Increased production of IL-6 may play a role in the pathogenesis of ADHD

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J Clin Psychiatry. 2018;79.

**TRAUMATIC BRAIN INJURY IN EARLY CHILDHOOD AND RISK OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND AUTISM SPECTRUM DISORDER: A NATIONWIDE LONGITUDINAL STUDY.**

**Chang H-K, Hsu J-W, Wu J-C, et al.**

**Objective:** Early childhood (< 3 years of age) is a critical period for neurodevelopment. This study investigated the correlation between early childhood traumatic brain injury (TBI) and subsequent risk of attention-deficit/hyperactivity disorder (ADHD), autism spectrum disorder (ASD), and developmental delay (DD) by analyzing a national-scale cohort.

**Methods:** Data from the National Health Insurance Research Database, which comprises health care information from > 99% of the Taiwanese population, were analyzed. Children with TBI in their early childhood were enrolled from 1998-2008, and the incidence of subsequent ADHD, ASD, or DD (according to ICD-9 criteria) was assessed and compared with controls without TBI. Patients' age, number of TBI events, and TBI severity were investigated for the risk of ADHD, ASD, or DD.

**Results:** A total of 7,801 and 31,204 children were enrolled in the TBI and control cohorts, respectively. The TBI cohort exhibited a higher incidence of subsequent ADHD, ASD, or DD than the controls (all  $P < .001$ ). Diagnoses of ADHD, ASD, or DD in the TBI cohort were made at a younger age compared with the controls. Cox regression demonstrated the highest hazard ratios (HRs) of ADHD, ASD, or DD with repeated TBI events, severe TBI, and TBI events before 1 year of age, with the exception that the HR of ASD did not significantly increase after repeated TBI ( $P = .335$ ). In addition, cumulative HRs (> 10 years) of ADHD, ASD, or DD were increased after TBI (all  $P < .001$ ).

**Conclusions:** Data from this study suggest that the incidence of ADHD, ASD, and DD significantly increased after TBI events in early childhood (< 3 years of age). The risk factors include severe TBI, repeated TBI events, and TBI at a younger age. The long-term follow-up demonstrated an increased cumulative risk of ADHD, ASD, and DD after TBI

J Clin Psychopharmacol. 2019;39:39-45.

**POTENTIAL EXPLANATIONS FOR INCREASING METHYLPHENIDATE USE IN CHILDREN AND ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN GERMANY FROM 2004 TO 2013.**

**Langner I, Haug U, Scholle O, et al.**

**Background** Despite a decreasing population of children and adolescents, the cumulative total amount of dispensed methylphenidate (MPH), the first-choice treatment of attention-deficit/hyperactivity disorder (ADHD) in this age group, has increased dramatically in Germany. We investigated potential reasons for this increase such as changes in the ADHD prevalence over time and other potential explanations including the cumulative amount of dispensed MPH per person.

**Methods** Based on German claims data, we calculated standardized annual ADHD prevalence rates, proportions of ADHD cases treated with MPH and/or psychotherapy, and mean cumulative defined daily doses of ADHD drugs for 3-to 17-year-old children and adolescents from 2004 to 2013.

**Results** The ADHD prevalence increased continuously from 2004 to 2011 and remained stable thereafter. In ADHD cases, there was little variation in the proportion of individuals treated with drugs and in the frequency of psychotherapeutic treatment during the whole study period. The annual cumulative mean amount of MPH defined daily doses increased by approximately 30% from 2004 to 2008.

**Conclusions** Our analyses suggest that the increase in MPH use in Germany was mainly influenced by an increasing ADHD prevalence and increasing amounts of dispensed MPH per person

J Consult Clin Psychol. 2019;87:112-17.

**LITTLE EVIDENCE FOR LATE-ONSET ADHD IN A LONGITUDINAL SAMPLE OF WOMEN.**

**Ahmad SI, Owens EB, Hinshaw SP.**

**Objective:** Individuals with late-onset symptoms of attention-deficit/hyperactivity disorder (ADHD) are presenting to providers at increasing rates. Recent birth-cohort studies reveal evidence for late-onset ADHD,

but conclusions are challenged by measurement methods as well as presence of participant impairment and psychiatric comorbidities. We examined the occurrence of late-onset ADHD in a small but thoroughly investigated group of diverse (47% white) women followed from childhood to adulthood.

**Method:** From a larger, 16-year longitudinal study, a subsample of young women without childhood ADHD (N 87) was assessed at four time points between childhood and adulthood via a multimethod, multiinformant approach. We used a stepped diagnostic procedure to identify those who initially met symptom criteria for ADHD after childhood and then evaluated them for remaining DSM ADHD diagnostic criteria, including impairment, cross-situational symptoms, and comorbid diagnoses.

**Results:** Of 87 participants, 17 met ADHD symptom criteria after childhood. Fifteen showed no evidence of childhood onset, 10 showed clear evidence of impairment, and nine had cross-situational symptoms. Of these nine, all but one showed clinically significant co-occurring or preexisting psychiatric diagnoses and/or substance use that might account for ADHD symptoms.

**Conclusions:** Although 19.5% of women from our subsample without childhood ADHD met symptom criteria for ADHD during adolescence/ adulthood, only one showed the needed combination of impairment and cross-situational symptoms without significant co-occurring mental health problems. It is possible that uncomplicated cases of adult ADHD do arise, yet we find little supporting evidence herein

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J Neurodevelopmental Disord. 2018 Nov;10.

**AN EMOTION RECOGNITION SUBTYPING APPROACH TO STUDYING THE HETEROGENEITY AND COMORBIDITY OF AUTISM SPECTRUM DISORDERS AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.**

**Waddington F, Hartman C, de Bruijn Y, et al.**

**Background:** Emotion recognition dysfunction has been reported in both autism spectrum disorders (ASD) and attention-deficit/hyperactivity disorder (ADHD). This suggests that emotion recognition is a cross-disorder trait that may be utilised to understand the heterogeneous psychopathology of ASD and ADHD. We aimed to identify emotion recognition subtypes and to examine their relation with quantitative and diagnostic measures of ASD and ADHD to gain further insight into disorder comorbidity and heterogeneity.

**Methods:** Factor mixture modelling was used on speed and accuracy measures of auditory and visual emotion recognition tasks. These were administered to children and adolescents with ASD (N = 89), comorbid ASD + ADHD (N = 64), their unaffected siblings (N = 122), ADHD (N = 111), their unaffected siblings (N = 69), and controls (N = 220). Identified classes were compared on diagnostic and quantitative symptom measures.

**Results:** A four-class solution was revealed, with the following emotion recognition abilities: (1) average visual, impulsive auditory; (2) average-strong visual and auditory; (3) impulsive/imprecise visual, average auditory; (4) weak visual and auditory. The weakest performing class (4) contained the highest percentage of patients (66.07%) and the lowest percentage controls (10.09%), scoring the highest on ASD/ADHD measures. The best performing class (2) demonstrated the opposite: 48.98% patients, 15.26% controls with relatively low scores on ASD/ADHD measures.

**Conclusions:** Subgroups of youths can be identified that differ both in quantitative and qualitative aspects of emotion recognition abilities. Weak emotion recognition abilities across sensory domains are linked to an increased risk for ASD as well as ADHD, although emotion recognition impairments alone are neither necessary nor sufficient parts of these disorders

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J Neurodevelopmental Disord. 2018;10.

**SUBSTANCE USE AND NICOTINE DEPENDENCE IN PERSISTENT, REMITTENT, AND LATE-ONSET ADHD: A 10-YEAR LONGITUDINAL STUDY FROM CHILDHOOD TO YOUNG ADULTHOOD.**

**Ilbegi S, Groenman AP, Schellekens A, et al.**

**Background:** Attention-deficit/hyperactivity disorder (ADHD) is associated with substance use disorders (SUD; alcohol and/or drug dependence) and nicotine dependence. This study aims to advance our



knowledge about the association between SUD, nicotine dependence, and the course of ADHD (persistent versus remittent ADHD and late-onset ADHD).

**Methods:** ADHD, SUD, and nicotine dependence were longitudinally assessed (mean age at study entry 11.3 years, mean age at follow-up 21.1 years) using structured psychiatric interviews and multi-informant questionnaires in a subsample of the Dutch part of the International Multicenter ADHD Genetics study. Individuals with persistent ADHD (n = 62), remittent ADHD (n = 12), late-onset ADHD (n = 18; age of onset after 12 years), unaffected siblings (n = 50), and healthy controls (n = 47) were assessed. Hazard ratios (HR) with 95% confidence intervals (CIs) were estimated by Cox regression and adjusted for clustered family data, gender, follow-up length, and current age.

**Results:** Individuals with persistent ADHD were at significantly higher risk of development of SUD relative to healthy controls (HR = 4.56, CI 1.17-17.81). In contrast, levels of SUD in those with remittent ADHD were not different from healthy controls (HR = 1.00, CI.07-13.02). ADHD persisters had also higher prevalence rates of nicotine dependence (24.2%) than ADHD remitters (16.7%) and healthy controls (4.3%). A similar pattern was found in initially unaffected siblings who met ADHD criteria at follow-up ("late-onset" ADHD); they had also a higher prevalence of SUD (33%) compared to stable unaffected siblings (20%) and were at significantly increased risk of development of nicotine dependence compared to healthy controls (HR = 13.04, CI 2.08-81.83).

**Conclusions:** SUD and nicotine dependence are associated with a negative ADHD outcome. Results further emphasize the need for clinicians to comprehensively assess substance use when diagnosing ADHD in adolescents and adults

Journal of Pain Research. 2018;11:2827-36.

**PREVALENCE OF AUTISM TRAITS AND ATTENTION-DEFICIT HYPERACTIVITY DISORDER SYMPTOMS IN A CLINICAL SAMPLE OF CHILDREN AND ADOLESCENTS WITH CHRONIC PAIN.**

**Lipsker CW, et al.**

**Purpose:** Recent research has suggested that autism spectrum disorder (ASD) and attention-deficit hyperactivity disorder (ADHD) may be comorbid to pediatric chronic pain, but the empirical support is yet scarce. Therefore, the current study aimed to investigate the occurrence of traits and symptoms consistent with clinically significant ASD and ADHD in a group of children and adolescents with chronic debilitating pain and examine potential differences in pain and demographic variables between children with and without clinically significant traits and symptoms of ASD and ADHD.

**Patients and methods:** This cross-sectional study included 146 parent-child dyads (102 girls, 111 mothers, children 8–17 years) consecutively referred to a tertiary pain clinic. Parents completed the Social Responsiveness Scale to assess autistic traits, and Conners-3 to measure symptoms of ADHD in their children. Children completed the L+beck Pain Questionnaire to evaluate experienced pain.

**Results:** Among children, 20 (13.7%) received scores consistent with clinically significant ASD and 29 (19.9%) received scores consistent with clinically significant ADHD, with a combined prevalence of clinically significant ASD/ADHD traits and symptoms of 26% of the total sample. Only 4.8% of children were previously diagnosed with either disorder. Among children with clinically significant ASD traits, girls were more prevalent, parents reported lower health, and the pain was more likely triggered by being in school. Among children with clinically significant ADHD symptoms, there were no gender differences and pain was more likely triggered by the family situation and new situations. No differences regarding pain intensity, duration, or frequency were found between children with and without clinically significant ASD traits or ADHD symptoms.

**Conclusion:** Children with debilitating chronic pain, particularly girls, may present with an elevated risk of having a comorbid, possibly high-functioning, neurodevelopmental disorder. Results suggest that clinical assessment of pediatric chronic pain should include screening for neurodevelopmental disorders



Journal of Pediatric Epilepsy. 2018;7:89-96.

**PRACTICAL CONSIDERATIONS FOR THE ASSESSMENT AND TREATMENT OF ADHD IN CHILDREN WITH EPILEPSY.**

**Tangen RB, Diekroger EA.**

Attention deficit hyperactivity disorder (ADHD) is one of the most prevalent psychiatric comorbidities in children with epilepsy, but it is under diagnosed and under treated which can impact the quality of life. Knowledge regarding ADHD characteristics, epilepsy-related risk factors, and associations with specific types of epilepsy provide a base for assessment. Epilepsy-related variables have not consistently predicted ADHD status, so screening and assessment for ADHD in children with epilepsy should be systematic and broad. Different assessment tools and techniques can be helpful including rating scales, diagnostic interviews, and neuropsychological testing. Treatment of ADHD with methylphenidate has been found to be safe and effective including in populations with uncontrolled seizures and coexisting intellectual disability. There are limited data on other medication and behavioral treatments. To improve assessment, diagnosis and treatment, medical provider knowledge, and practices, as well as family barriers to behavioral health should be targeted

J Psychiatr Res. 2019;110:64-73.

**THE EFFECTIVENESS OF OMEGA-3 SUPPLEMENTATION IN REDUCING ADHD ASSOCIATED SYMPTOMS IN CHILDREN AS MEASURED BY THE CONNERS' RATING SCALES: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS.**

**Abdullah M, Jowett B, Whittaker PJ, et al.**

Omega-3 supplements are considered to have anti-inflammatory effects which may be beneficial as inflammation has been linked to ADHD. The aim of this review is to examine the effectiveness of omega-3 supplementation at reducing ADHD symptoms in children and adolescents. Medline, Cinahl+, PsycINFO, Cochrane and Embase were searched for trials investigating the effects of omega-3 supplementation in children and adolescents with ADHD. The primary outcome measure was a mean difference in Conners' rating scale (CRS) between the intervention and placebo group. Search terms used include ADHD, omega-3, fish oils, eicosapentaenoic acid, docosahexaenoic acids, alpha-linolenic acid and Conners' rating scale. Randomized controlled trials examining the efficacy of omega-3 supplementation in children and adolescents as measured by CRS were included. Studies using a combination of polyunsaturated fatty acids or any other rating scale were excluded. Seven trials were included in this review, totalling 926 participants. We found no evidence of publication bias or heterogeneity between trials. Overall, there was a slightly greater reduction in CRS score in favour of the experiment group. One study found a greater reduction in score in favour of the placebo group. Neither findings were statistically significant. There is little supportive evidence to validate the claim of omega-3 supplementation to reduce the degree of ADHD symptoms experienced by children and adolescents. Both experiment and control groups saw similar reductions in Conners rating scale score

J Psychiatr Res. 2019;109:185-92.

**PROFILING OF miRNAs IN SERUM OF CHILDREN WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER SHOWS SIGNIFICANT ALTERATIONS.**

**Zadehbagheri F, Hosseini E, Bagheri-Hosseini Z, et al.**

**Background:** Attention-deficit/hyperactivity disorder (ADHD), a common psychiatric disorder, is identified by abnormal levels of impulsivity, inattention, and hyperactivity. MiRNAs play important roles in neural network development of the brain. Circulating miRNAs (cmRNAs) are offered as promising noninvasive markers for psychiatric disorders. In this study, the expression level of neurologically relevant miRNAs was evaluated in serum samples of ADHD individuals.

**Methods:** RNA extraction was performed for 60 subjects with ADHD and 60 healthy controls, and the cDNAs were synthesized for all the miRNAs. The expression level of 84 cmRNAs was then examined in 4 ADHD subjects and 4 controls. The altered expression of 10 cmRNAs was further evaluated in validation cohort comprising 56 ADHD and 56 control samples by qPCR. The diagnostic power of the miRNAs was determined by use of Receiver-operating characteristic (ROC) analysis. The cmRNAs target genes were predicted using DIANA mirPath software and gene ontology enrichment analysis was performed using Cytoscape CLUGO.

**Results:** Initially, 10 miRNAs showed differential expression in ADHD individuals. Further analysis confirmed four miRNAs (hsa-miR-101-3p, hsa-miR-130a-3p, hsa-miR-138-5p and hsa-miR-195-5p) upregulated and one miRNA (hsa-miR-106b-5p) downregulated. These miRNAs showed significant predictive values for discriminating ADHD individuals. Enrichment analysis highlighted the involvement of the deregulated miRNAs in many canonical neurobiological pathways and mechanisms.

**Conclusions:** Our report is the first comprehensive study on the expression profiling of miRNAs in serum of ADHD subjects. These findings suggest a set of miRNAs as potential noninvasive biomarkers for ADHD

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Med Sci Monit. 2018;24:7759-69.

**BEHAVIORAL AND EMOTIONAL PROBLEMS IN EARLY-TREATED BRAZILIAN CHILDREN AND ADOLESCENTS WITH PHENYLKETONURIA.**

**Neto EV, Filho HSM, Monteiro CB, et al.**

**Background:** Phenylketonuria (PKU) is an inborn error of metabolism caused by mutations in the phenylalanine hydroxylase (PAH) gene. When untreated, PKU leads to a significant intellectual deficiency. Although early initiation of dietary therapy allows normal cognitive development, low adherence to treatment may result in neuropsychological deficits, including attention problems. This study was performed to evaluate emotional and behavioral problems in early-treated children and adolescents with PKU using the Child Behavior Checklist CBCL/6-18 answered by parents.

**Material/Methods:** The study included 36 PKU patients. The mean scores of internalizing, externalizing, and total problems, syndrome scales, and DSM-IV-oriented scales of patients were compared with those of controls. An analysis to evaluate the importance of adherence to treatment and presence of intellectual disability was also performed.

**Results:** There were no significant differences between patients and controls for almost all CBCL/6-18 scales, with the exception of the Attention Problem Scale CBCL-APS. The mean (±SD) of the CBCL-APS scores of patients (7.86±5.33) was considerably higher than the mean of the controls (6.07±4.37;  $p=0.016$ ), but not different from the mean of a matched control subsample (6.69±4.46;  $p=0.316$ ). The difference between the mean of the scores of DSM-IV/ADHD scale of patients (6.72±4.07) and controls (5.73±3.56;  $p=0.102$ ) was not significant. Non-adherence to treatment and intellectual disability had a negative impact on both CBCL-APS and DSM-IV/ADHD scale scores.

**Conclusions:** Our findings indicate a significant prevalence of parents complaints of attention problems and hyperactivity in non-adherent to treatment and intellectually low performing patients with PKU

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Mol Psychiatry. 2019.

**ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND LIFETIME CANNABIS USE: GENETIC OVERLAP AND CAUSALITY.**

**Soler AM, Sánchez-Mora C, Rovira P, et al.**

Attention-deficit/hyperactivity disorder (ADHD) is a severely impairing neurodevelopmental disorder with a prevalence of 5% in children and adolescents and of 2.5% in adults. Comorbid conditions in ADHD play a key role in symptom progression, disorder course and outcome. ADHD is associated with a significantly increased risk for substance use, abuse and dependence. ADHD and cannabis use are partly determined by genetic factors; the heritability of ADHD is estimated at 70%–80% and of cannabis use initiation at 40%–48%. In this study, we used summary statistics from the largest available meta-analyses of genome-wide association studies (GWAS) of ADHD ( $n = 53,293$ ) and lifetime cannabis use ( $n = 32,330$ ) to gain insights into the genetic overlap and causal relationship of these two traits. We estimated their genetic correlation to be  $r^2 = 0.29$  ( $P = 1.63 \times 10^{-5}$ ) and identified four new genome-wide significant loci in a cross-trait analysis: two in a single variant association analysis (rs145108385,  $P = 3.30 \times 10^{-8}$  and rs4259397,  $P = 4.52 \times 10^{-8}$ ) and two in a gene-based association analysis (WDPCP,  $P = 9.67 \times 10^{-7}$  and ZNF251,  $P = 1.62 \times 10^{-6}$ ). Using a two-sample Mendelian randomization approach we found support that ADHD is causal for lifetime cannabis use, with an odds ratio of 7.9 for cannabis use in individuals with ADHD in comparison to individuals without ADHD (95% CI (3.72, 15.51),  $P = 5.88 \times 10^{-5}$ ).

These results substantiate the temporal relationship between ADHD and future cannabis use and reinforce the need to consider substance misuse in the context of ADHD in clinical interventions

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Neurol Sci. 2019.

**DECREASED SERUM OREXIN A LEVELS IN DRUG-NAIVE CHILDREN WITH ATTENTION DEFICIT AND HYPERACTIVITY DISORDER.**

**Baykal S, Albayrak Y, Duranku+*f*F, et al.**

Attention deficit/hyperactivity disorder (ADHD) is one of the most common psychiatric disorders of childhood and characterized by inattention, hyperactivity, and impulsivity. ADHD is a neurodevelopmental disorder, and its etiology has not yet been determined precisely. Orexin A is thought to play an important role in different forms of learning, memory, and attention. Despite its importance in attention and learning, no study has investigated serum orexin levels in patients with ADHD. In the present study, we aimed to compare serum orexigenic neuropeptides such as orexin A and orexin B, neuropeptide Y, and ghrelin between drug naive children with ADHD and healthy children. Fifty-six drug-naive children with ADHD and 40 healthy controls were enrolled in the study. After comparison of serum orexin A and orexin B, neuropeptide Y, and ghrelin, we found that serum orexin A levels were significantly lower in the ADHD group ( $p = 0.001$ ). Furthermore, serum orexin A levels were compared between ADHD subgroups. Orexin A levels were significantly lower in the inattentive subtype compared with the hyperactive subtype and combined subtype ( $p = 0.009$ ). Our results indicate that orexin A might be a neurobiological etiological factor in ADHD, particularly associated with attention symptoms. The present study is the first to demonstrate decreased serum orexin A levels in drug-naive children with ADHD. Further studies are needed to confirm our results and to show the effects of treatments involving orexin A in patients with ADHD

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NeuroMol Med. 2019.

**ADGRL3 rs6551665 AS A COMMON VULNERABILITY FACTOR UNDERLYING ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND AUTISM SPECTRUM DISORDER.**

**Kappel DB, Schuch JB, Rovaris DL, et al.**

Neurodevelopmental disorders are prevalent, frequently occur in comorbidity and share substantial genetic correlation. Previous evidence has suggested a role for the ADGRL3 gene in Attention-Deficit/Hyperactivity Disorder (ADHD) susceptibility in several samples. Considering ADGRL3 functionality in central nervous system development and its previous association with neurodevelopmental disorders, we aimed to assess ADGRL3 influence in early-onset ADHD (before 7-áyears of age) and Autism Spectrum Disorder (ASD). The sample comprises 187 men diagnosed with early-onset ADHD, 135 boys diagnosed with ASD and 468 male blood donors. We tested the association of an ADGRL3 variant (rs6551665) with both early-onset ADHD and ASD susceptibility. We observed significant associations between ADGRL3 rs6551665 on ADHD and ASD susceptibilities; we found that G-carriers were at increased risk of ADHD and ASD, in accordance with previous studies. The overall evidence from the literature, corroborated by our results, suggests that ADGRL3 might be involved in brain development, and genetic modifications related to it might be part of a shared vulnerability factor associated with the underlying neurobiology of neurodevelopmental disorders such as ADHD and ASD

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Neuropsychiatr Dis Treat. 2019;15:157-66.

**RISK FACTORS FOR THE DIFFICULTIES IN GENERAL ACTIVITIES ACROSS THE DAY IN CHINESE CHILDREN AND ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.**

**Ke X, Du Y, Zheng Y, et al.**

**Objectives:** To explore the factors significantly associated with the difficulties of general activities during specific time periods across the day in Chinese children and adolescents with attention-deficit/hyperactivity disorder (ADHD).

**Methods:** A cross-sectional study assessing the validity and reliability of Questionnaire-Children with Difficulties (QCD) for difficulties of general activities during specific time periods of the day in 200 Chinese children and adolescents with ADHD was the data source for this post-hoc analysis. Multivariate linear regression analyses were conducted to identify the factors significantly associated with the total and subscale scores of QCD respectively.

**Results:** ADHD subtype of inattention (vs combination subtype, coefficient 3.69,  $P=0.006$ ), parent child interaction activity (vs no parent child activity, coefficient 4.30,  $P=0.002$ ), and any psychiatric comorbidities (vs no mental comorbidities, coefficient -3.68,  $P=0.010$ ) were independently and significantly associated with the total score of QCD (higher score indicating less difficulties, and vice-versa). These three factors and the other two factors, including mother's education and parenting style, were independently and significantly associated with at least one subscale score of QCD for the five time domains across the day.

**Conclusion:** The overall difficulties of the general activities across the day in ADHD patients could be independently affected by ADHD subtype, psychiatric comorbidities, and parent children interaction activity. However, the factors significantly associated with the difficulties of the general activities during specific time periods of the day in ADHD patients were slightly different

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Neuropsychology. 2019 Jan.

**PLANNING DEFICITS IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD): A META-ANALYTIC REVIEW OF TOWER TASK PERFORMANCE.**

**Patros CHG, Tarle SJ, Alderson RM, et al.**

**Objective:** Deficient planning is commonly observed among children and adolescents with attention-deficit/hyperactivity disorder (ADHD) and is associated with several adverse outcomes. The current meta-analysis expands on previous reviews by examining performance and latency metrics across five tower planning task variants, in addition to applying metaregression techniques to examine potential moderating effects.

**Method:** Forty-one studies (NADHD = 2,051; NTD = 2,766) provided sufficient information to calculate between-group effect sizes and were included in the current study.

**Results:** Results revealed moderate-magnitude planning deficits exhibited by children with ADHD, ranging from Hedge's  $g$  of 0.36 to 0.59. Analysis of latency metrics revealed small- to moderate-magnitude between-groups differences (Hedge's  $g$  ranging from -0.42 to 0.41), such that children with ADHD responded more quickly on planning tasks when compared with typically developing peers. Age, percentage of females, solution presentation (e.g., pictorial vs. physical display), and task complexity (beads vs. disks) were identified as statistically significant moderating variables across planning metrics.

**Conclusions:** Although aggregated findings suggest that children with ADHD, compared with typically developing children, exhibit moderate planning deficits, researchers and clinicians are advised to consider our findings of significant participant and task moderating variables when interpreting children's performance on tower tasks.

**General Scientific Summary—**ADHD-related planning deficits are commonly examined in research and clinical settings via the tower-task paradigm. This meta-analytic review summarizes/quantifies findings from previous studies and identifies participant and task variables that influence the magnitude of observed effects

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Pediatric Obesity. 2019.

**SEX AND RACIAL/ETHNIC DIFFERENCES IN THE ASSOCIATION BETWEEN CHILDHOOD ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOM SUBTYPES AND BODY MASS INDEX IN THE TRANSITION FROM ADOLESCENCE TO ADULTHOOD IN THE UNITED STATES.**

**Inoue Y, Howard AG, Stickle A, et al.**

**Background:** While attention-deficit/hyperactivity disorder (ADHD) has been associated with higher body mass index (BMI), little research has focused on how this association differs by sex or race/ethnicity. **Objective:** To investigate the association between ADHD and BMI by sex and race/ethnicity (ie, European [EA], African [AA], and Hispanic American [HA]).

**Methods:** Data came from the National Longitudinal Survey of Adolescent to Adult Health Waves II to IV (n=13,332, age: 12-34 years). On the basis of self-reported childhood ADHD symptoms between the ages of 5 and 12 years, participants were categorized into: ADHD predominantly hyperactive/impulsive (ADHD-HI); ADHD predominantly inattentive (ADHD-I); ADHD combined (ADHD-C; a combination of ADHD-HI and ADHD-I symptoms); and non-ADHD.

**Results:** The patterns of ADHD-BMI associations in the transition period between adolescence and young adulthood differed by sex and race/ethnicity. Compared with non-ADHD, ADHD-HI was associated with higher BMI among EA males and females, while ADHD-I was associated with higher BMI among EA females. ADHD-C was associated with higher BMI for HA females. We found no evidence of an association among AA males and females and HA males.

**Conclusion:** These study results suggest that the association between ADHD subtypes and BMI might differ across population subgroups in the United States

Psychiatr Serv. 2019;70:26-34.

**ADHERENCE TO RECOMMENDED CARE GUIDELINES IN THE TREATMENT OF PRESCHOOL-AGE MEDICAID-ENROLLED CHILDREN WITH A DIAGNOSIS OF ADHD.**

**Moran A, Serban N, Danielson ML, et al.**

**Objective:** Attention-deficit/hyperactivity disorder (ADHD) is the most common neurodevelopmental disorder of childhood. Clinical guidelines recommend behavior therapy as the first-line treatment for preschool-age children with ADHD. This study evaluated longitudinal patterns of services received by Medicaid-enrolled children ages 2 to 5 with ADHD in seven southeastern states (Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, and South Carolina).

**Methods:** A discrete sequence clustering analysis was used with 2005-2012 Medicaid Analytic eXtract data to profile patient-level utilization for each state, with a focus on receipt of psychological services and medication. The model output was used to assess utilization behaviors longitudinally relative to recommended care guidelines and to characterize sources of variation in utilization patterns by demographic and ecological

**Results:** Five states had a utilization profile with a high probability of receipt of psychological services before medication among children with ADHD, covering 16% of the total study population. Most young children's ADHD care experience in the seven states (65%) fit utilization profiles characterized by a high probability of receiving any ADHD medication. Black race was significantly associated with higher utilization of psychological services in three states.

**Conclusions:** About 16% of Medicaid-enrolled preschoolage children with ADHD received care during 2005-2012 that appeared to be consistent with 2011 recommended care guidelines. State-level and subpopulation variations in utilization for ADHD-related clinical care were found. The findings indicate that there were major gaps in treatment for ADHD among young children and that the gaps are wider for some states and subpopulations of children



Psychiatry Res. 2019;272:392-97.

**PRE-ECLAMPSIA AND THE RISK OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN OFFSPRING: FINDINGS FROM THE ALSPAC BIRTH COHORT STUDY.**

***Dachew BA, Scott JG, Mamun A, et al.***

Attention-deficit/hyperactivity disorder (ADHD) is a prevalent heterogeneous neurodevelopmental syndrome associated with various environmental factors. This study examined the association between maternal pre-eclampsia and offspring ADHD at 7- and 10-years. The study cohort consisted of more than 7200 children who participated in Avon Longitudinal Study of Parents and Children (ALSPAC) birth cohort study. ADHD was diagnosed using parent reported Development and Wellbeing Assessment (DAWBA). Log-binomial regression and Generalized Estimating Equation (GEE) models were used. The GEE analysis showed that pre-eclampsia was associated with increased risk of ADHD in offspring (adjusted risk ratio [RR] = 2.77; 95% confidence interval [CI] = 1.42-5.38). Similarly, the results of multivariable log-binomial regression analysis at each time point showed that pre-eclampsia was associated with an almost threefold increase risk of offspring ADHD. This study suggests that offspring of mothers with pre-eclampsia are at increased risk of ADHD, although residual and unmeasured confounding by environmental and genetic factors warrants further study. If our findings are replicated by others, early screening for ADHD and other developmental delays may be recommended in offspring of women with pre-eclampsia

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Psychiatry Res. 2019;272:765-73.

**DO DIFFERENT FACTORS INFLUENCE WHETHER GIRLS VERSUS BOYS MEET ADHD DIAGNOSTIC CRITERIA? SEX DIFFERENCES AMONG CHILDREN WITH HIGH ADHD SYMPTOMS.**

***Mowlem F, Agnew-Blais J, Taylor E, et al.***

We investigate if different factors influence whether girls versus boys meet diagnostic criteria for attention-deficit/hyperactivity disorder (ADHD) among children with high ADHD symptoms. Participants were 283 children aged 7-12 from a population-based study. Girls and boys meeting diagnostic criteria for ADHD, based on an objective investigator-based interview, were compared to children who did not meet criteria despite high symptoms on a rating-scale measure of ADHD. We assessed factors that could differentially relate to diagnosis across girls and boys including ADHD symptoms, co-occurring behavioural/emotional problems and impairment, and sex-effects in rater perceptions of ADHD symptoms. While overall similar factors distinguished girls and boys who met diagnostic criteria from high-symptom peers, effect sizes were larger in girls. Emotional problems were particularly salient to distinguishing diagnosed versus high-symptom girls but not boys. Parents rated boys meeting diagnostic criteria as more impaired than high-symptom boys but did not do so for girls, and under-rated diagnosed girls' hyperactive/impulsive symptoms compared to more objective interview assessment, with the opposite observed in boys. Results suggest girls' ADHD may need to be made more prominent by additional behavioural/emotional problems for them to meet full diagnostic criteria and that sex differences in parental perceptions of ADHD behaviours and impairment exist

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Psychiatry Res. 2019;273:235-39.

**CHRONOTYPICAL CHARACTERISTICS AND RELATED miR-142-3P LEVELS OF CHILDREN WITH ATTENTION DEFICIT AND HYPERACTIVITY DISORDER.**

***Karadag M, Gokcen C, Nacarkahya G, et al.***

To compare children with Attention Deficit and Hyperactivity Disorder (ADHD) and a healthy control group in terms of chronotype characteristics and miRNA-142-3p/miRNA-378 levels. 50 children with ADHD and 44 healthy children were included in the study. Childhood Chronotype Questionnaire was used to identify the chronotype preferences of children. Serum miR-142-3p and miR-378 levels were determined. Preference for nighttime was higher in children with ADHD. Additionally, a night preference was found to be associated with attention deficit in both groups. While a significant correlation was found between the psychopathology rate in mothers and the presence of ADHD, there was no such correlation in fathers. In the comparison between children with ADHD and the control group, no significant difference was found between miRNA



levels. Both the miR-142-3p and miR-378 values of the children with ADHD that have immediate relatives with a psychiatric disorder were lower, compared to control group. We found that shift to night preference in the circadian rhythm was higher and this preference was associated with attention deficit in the children with ADHD. In addition, the presence of psychopathology in the family and the mother's psychopathology affected the miR-142-3p and miR378 levels

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Psychiatry Res. 2019;273:402-21.

**AN EXAMINATION OF THE ASSOCIATION BETWEEN ANXIETY AND SOCIAL FUNCTIONING IN YOUTH WITH ADHD: A SYSTEMATIC REVIEW.**

**Bishop C, Mulraney M, Rinehart N, et al.**

Although up to 50% of children with Attention-Deficit/Hyperactivity Disorder (ADHD) meet criteria for an anxiety disorder, it is unclear how comorbid anxiety influences social functioning for this population. Understanding the factors associated with social functioning in ADHD is important given the limited efficacy of existing social skills interventions for this population. This systematic review aimed to determine the association between anxiety and social functioning (social problems, peer status, and social skills/competence) in children and adolescents with ADHD. A standardised search protocol was used, identifying 4807 articles for screening with 31 included in the final review. Anxiety symptom severity was associated with lower levels of social skills and higher levels of social problems in young people with ADHD. However, few differences emerged when defining anxiety based on diagnostic measures. Although the results varied considerably amongst studies, a number of key variables emerged that influenced the associations between anxiety and social functioning including the type of reporter and sample characteristics such as age, sex, ADHD subtype and other mental health comorbidities. These findings have implications for social functioning interventions in ADHD given the role of anxiety symptoms in predicting poorer social functioning

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Psychol Addict Behav. 2019 Jan.

**SPECIFICITY OF EXPECTANCIES PROSPECTIVELY PREDICTING ALCOHOL AND MARIJUANA USE IN ADULTHOOD IN THE PITTSBURGH ADHD LONGITUDINAL STUDY.**

**Walther CAP, Pedersen SL, Gnagy E, et al.**

Alcohol and marijuana use expectancies are presumed to be drug-specific, but prospective study of this assumption is lacking. In addition, these associations may operate differently for adults with attention-deficit/hyperactivity disorder (ADHD) histories, as expectancies have been found to be less associated with alcohol and marijuana use among this population. The first aim of the present study was to investigate whether associations between alcohol and marijuana expectancies and substance use were specific to the substances they assess. The second aim was to determine whether these associations differed as a function of ADHD history. Participants (N = 491; 281 ADHD, 210 non-ADHD) were young adults followed longitudinally between ages 21 to 23 and 29 as part of the Pittsburgh ADHD Longitudinal Study (PALS). Autoregressive models were estimated separately for positive and negative expectancies for frequency of alcohol and marijuana use and compared between ADHD groups. Although there were exceptions, results generally support the specificity of associations between outcome expectancies and respective substance use both concurrently and prospectively, but this specificity was primarily present for those without a history of ADHD. These findings suggest that young adults perceive and respond distinctly to the effects of alcohol and marijuana, but a history of ADHD may interfere with this process. These findings also extend our prior cross-sectional findings that expectancies are less associated with alcohol and marijuana use for individuals with ADHD histories. Additional research examining implicit cognitions is needed to further examine risk for substance use among those with ADHD histories

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Quality of Life Research. 2018.

**IS IT POSSIBLE TO DETERMINE THE LEVEL OF FUNCTIONAL IMPAIRMENT THAT DISTINGUISHES THE PATIENTS WITH ADHD FROM THOSE WITHOUT ADHD?**

**Tarakcioglu M.C., Gokler M.E., Kadak MT, et al.**

**Introduction:** Functional impairment in attention deficit hyperactivity disorder (ADHD) can occur in many areas such as in family, social activities, and problems related to school and may also persist during adulthood. The Weiss Functional Impairment Rating Scale-Parent Form (WFIRS-P) is designed to measure the functional impairment related to ADHD symptoms. The aim of this study was to determine the level of functional impairment that distinguishes the patients with ADHD who were diagnosed through semi-structured interviews from those without ADHD.

**Method:** This study consists of ADHD patients who were diagnosed through semi-structured interview aged 5-18 years (n = 250) and same age gender-matched healthy controls (n = 250). A receiver operating characteristic (ROC) curve was constructed by calculating the sensitivity and specificity of the scale cut-off values.

**Results:** An area under the curve (AUC) of 0.974 (95% CI 0.956-0.986) was found in this study. For WFIRS-P subdomains, AUC curves, which range from 0.76 to 0.95, were also having strong power for differentiation between groups. The optimal cut-off value for WFIRS-P using Youden's J Index is 0.32. There is no significant gender and age group differences in AUC for either the total or subdomain scores.

**Conclusion:** Our findings provide that Turkish version of WFIRS-P could be a reliable way of distinguishing the level of functional impairment in ADHD from controls

Res Dev Disabil. 2019;85:217-28.

**NEURODEVELOPMENTAL CORRELATES OF BEHAVIOURAL AND EMOTIONAL PROBLEMS IN A NEUROPAEDIATRIC SAMPLE.**

**Halvorsen M, Mathiassen B, Myrbakk E, et al.**

Most research does not address the overlap between neurodevelopmental disorders when investigating concomitant mental health problems. The purpose of the present study was to examine the association of intellectual disability (ID), autism spectrum disorder (ASD), and attention-deficit/hyperactivity disorder (ADHD) with the presence of behavioural and emotional problems after controlling for other well-known correlates and risk factors. The sample included 4- to 18-year-old children who attended neuropaediatric clinics (N = 331). After controlling for adversity, age, gender, other developmental/neurological disorders, parental emotional problems, and parenting strategies, the presence of ADHD but not ASD or ID was uniquely associated with behaviour problems. Neither ADHD nor ASD nor ID was significantly associated with emotional problems after controlling for other risk factors. However, ADHD, ASD and behavioural/emotional disorders but not ID were significantly associated with functional impairment in everyday activities after controlling for other risk factors. Because children with neurodevelopmental disorders have complex needs, a holistic approach to diagnosis and interventions is highly warranted, including the assessment and treatment of behavioural and emotional disorders

Revista Portuguesa de Estomatologia, Medicina Dentaria e Cirurgia Maxilofacial. 2018;59:169-73.

**LINGUAL FRENOTOMY OF A PATIENT WITH JUVENILE IDIOPATHIC ARTHRITIS AND ATTENTION DEFICIT HYPERACTIVITY DISORDER.**

**Gutierrez GM, Delmondes FS, Bonacina CF, et al.**

The aim of this paper is to describe the management of a clinical case of a teenager with Juvenile Idiopathic Arthritis (JIA), Attention Deficit Hyperactivity Disorder (ADHD) and ankyloglossia. A 12-year-old female using methotrexate and etanercept for the treatment of JIA, without the use of ADHD medication, presented tongue-tie and limited mouth opening. Frenectomy under local anesthesia was performed; antibiotic coverage was provided 24 hours before the procedure and maintained for one week after. After the surgical procedure, the patient was referred to a speech therapist to improve chewing and swallowing functions. It

was concluded that the knowledge of dentist about the oral manifestations of JIA, knowing the risk of infection of these patients when submitted to surgical procedures and, in cases of ankyloglossia, to observe the need for the patient to perform speech therapy after surgical intervention

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Revue Neurologique. 2019.

**PHARMACOLOGICAL TREATMENT OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN CHILDREN AND ADOLESCENTS WITH EPILEPSY.**

**Auvin S.**

Attention-deficit/hyperactivity disorder (ADHD) is the most frequent comorbidities in children with epilepsy with an increased risk of other psychiatric comorbidities and academic underachievement. In children with epilepsy, the attentive form is the most common clinical presentation in pediatric epilepsies. A systemic review and a consensus from the ILAE have been recently published on diagnosis, screening and management of ADHD in children with epilepsy. We give an overview of the pharmacological treatment of ADHD in children with epilepsy based on the lecture given at the International League Against Epilepsy (ILAE) French Chapter meeting, (October 2018, Lyon). Although only class II and class III studies are available, methylphenidate is the most appropriate pharmacological option for the treatment of ADHD in children with epilepsy with a limited risk of seizure worsening. The medical treatment should be used in combination of the global management including optimal antiepileptic drug treatment avoiding polytherapy, management of psychiatric comorbidities and support at school

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Sci Total Environ. 2019;659:161-67.

**BLOOD LEAD, BONE LEAD AND CHILD ATTENTION-DEFICIT-HYPERACTIVITY-DISORDER-LIKE BEHAVIOR.**

**Lin Y, Huang L, Xu J, et al.**

**Background and objective:** Mounting evidence showed that lead exposure increased the risk of child attention-deficit-hyperactivity disorder (ADHD). Epidemiologic studies have typically used the blood-lead as a biomarker of lead exposure; blood-lead levels mostly reflect recent lead exposure. However, few studies have examined the relationship between bone-lead, a biomarker of cumulative exposure, and ADHD. Therefore, we aimed to compare the associations of bone-lead vs blood-lead levels with child ADHD symptoms and comorbidities.

**Methods:** A total of 164 children aged 3-15 years were enrolled during 2014-2015. The Vanderbilt-ADHD-Diagnostic-Parent-Rating Scale (VADPRS) was used to evaluate the children's ADHD symptoms and comorbidities. Children's blood and bone lead concentrations were assessed, the latter using a non-invasive K-X-ray-fluorescence technique. According to blood-lead levels, children were classified into high (blood-lead  $\geq 10.0$   $\mu\text{g}/\text{dL}$ ) and low (blood-lead  $< 10.0$   $\mu\text{g}/\text{dL}$ ) blood-lead groups. According to bone-lead levels, children were classified into high (bone-lead  $\geq 2.66$   $\mu\text{g}/\text{g}$ ) and low (bone-lead  $< 2.66$   $\mu\text{g}/\text{g}$ ) bone-lead groups. We associated blood/bone lead with VADPRS data using multi-variable binary logistic regression models.

**Results:** Children in the high blood-lead group had higher hyperactivity/impulsivity ( $P = 0.02$ ) scores than the corresponding low blood-lead group. Children in the high bone-lead group had higher hyperactivity/impulsivity ( $P = 0.02$ ) and oppositional-defiant-disorder (ODD) ( $P = 0.03$ ) scores than the corresponding low bone-lead group. After adjusting for relevant confounders, children in the high bone-lead group were more likely to have ODD-behavior than the low group (OR = 6.7, 95%CI: 1.2-36.5). However, no adjusted association was observed between blood-lead and any ADHD-domain score.

**Conclusion:** High levels of cumulative lead exposure in children may be an independent risk factor of ODD-behavior

Socijalna Psihijatrija. 2018;46:372-89.

**RELATIONS BETWEEN TEACHER AND STUDENT CHARACTERISTICS IN THE ASSESSMENT OF SYMPTOMS OF INATTENTION, IMPULSIVITY AND HYPERACTIVITY RELATED TO ADHD.**

**Vlah N, et al.**

The paper examines teachers assessment of the symptoms of attention deficit, impulsivity and hyperactivity related to ADHD among elementary school students, the characteristics of class teachers and students and the relationship between them. Class teachers evaluated 242 students of all grades from 26 elementary schools evenly spread across four counties of the Republic of Croatia, in whom they detected four or more symptoms of inattention. Two scales were used: Checklist (Merrell and Tymms) and two dimensions of the Vanderbilt scale: inattention and impulsivity/hyperactivity. The correlation between class teacher characteristics (a greater number of weekly teaching hours and a higher level of assessed need for additional help in students learning and/or supporting behaviour problems) and the investigated dimensions was established by a correlation analysis. Furthermore, a lower degree of the self-assessed relationship with the student is associated with a higher level of hyperactivity/impulsivity incidence. Also, the school's academic achievement and material status of the students parents are related to the higher estimation of symptoms of inattention and impulsivity-hyperactivity. The students lower academic achievement is associated with a higher level of the teachers assessment of inattention, and higher academic achievement with a higher level of impulsivity-hyperactivity symptoms. The need for additional help in students learning has been associated with the increased levels of inattention, while the need for additional help in supporting behaviour is associated with all three symptoms

Substance Abuse: Research and Treatment. 2018;12.

**SYMPTOMS ASSOCIATED WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER AND AUTISM SPECTRUM DISORDERS IN SCHOOL-AGED CHILDREN PRENATALLY EXPOSED TO SUBSTANCES.**

**Sandtorv LB, Fevang SKE, Nilsen SA, et al.**

Prenatal exposure to substances may influence a child's neurodevelopment and impact on subsequent mental health. In a hospital-based population of school-aged children prenatally exposed to opiates and a number of illicit substances (n = 57), we evaluated mental health symptoms associated with attention deficit/hyperactivity disorder (ADHD) and autism spectrum disorders (ASD) using the Swanson, Nolan, and Pelham Questionnaire, revision IV (SNAP-IV) and the Autism Spectrum Screening Questionnaire (ASSQ) and compared the scores to a reference group which comprised children from the population-based Bergen Child Study (n = 171). Prenatally exposed children had significantly higher SNAP-IV scores associated with ADHD symptoms in both areas of inattention and hyperactivity/impulsivity and also reported a higher ASSQ score related to an increased number of symptoms associated with ASD, compared with the reference group. Of tested predictors of mental health outcomes in the exposed group, the intelligence quotient was a strong predictor of most mental health outcomes, and neonatal abstinence syndrome was a predictor of inattention. In conclusion, prenatally exposed children had more mental health symptoms associated with ADHD and ASD, compared with the reference group

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