NEWSLETTER

INDICE:

BIBLIOGRAFIA ADHD GENNAIO 2020

Acad Pediatr. 2020.

VARIATION IN RATE OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER MANAGEMENT BY PRIMARY CARE PROVIDERS.

Bannett Y, Feldman HM, Bentley JP, et al.

Objective: To describe variation in rates of attention-deficit/hyperactivity disorder (ADHD) management by pediatrics primary care providers (PCPs) and to assess influence of clinician characteristics on variation.

Methods: Retrospective cohort study of electronic health records from all office visits of patients aged 4 to 17 years seen at least twice between 2015 and 2017 by 73 clinicians in 9 pediatrics practices of a community-based primary health care network in California.

Outcomes per clinician: 1) percent patients seen for ADHD management; (2) percent ADHD patients with diagnosed comorbid conditions. Logistic random-effects regression models examined practice- and clinician-level variation.

Results: Of 40,323 patients in the cohort, 2039 (5.1%) carried an ADHD diagnosis, of which 1142 (56%) received ADHD medication. Percent of patients seen for ADHD management varied by clinician from 0.0% to 8.3% (median 3.0%). After accounting for practice-level variation and patient characteristics (ie, sex, age, insurance), clinician characteristics explained 28% of clinician variation in ADHD management. ADHD management rate was associated with high-percent full-time equivalent (odds ratio 1.17; 95% confidence interval 1.07 1.27). Percent of ADHD patients with diagnoses of comorbidities varied by clinician from 0.0% to 100% (median 35%). Association between ADHD management rate and comorbidity diagnosis was minimal (R = 0.10).

Conclusions: Objective electronic health records measures showed that PCPs in this network varied widely in their involvement in ADHD management. For most PCPs, percent of patients with ADHD and diagnosis of comorbidities was lower than estimated prevalence rates. Exploration of modifiable factors associated with PCP variation is needed to inform strategies for implementation of evidence-based practices

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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.

Acta Neuropsychiatr. 2019 Aug;31:220-29.

ASSOCIATIONS BETWEEN AUTISTIC-LIKE TRAITS AND POLYMORPHISMS IN NFKBIL1.

Strenn N, Hovey D, Jonsson L, et al.

OBJECTIVE: The immune system has been suggested to be associated with neuropsychiatric disorders; for example, elevated levels of cytokines and the inflammation-related transcription factor nuclear factor kappa-B (NF-kappaB) have been reported in individuals with autism spectrum disorder (ASD). The aim of this study was to investigate possible associations between autistic-like traits (ALTs) and single nucleotide polymorphisms (SNPs) in NFKB1 (encoding a subunit of the NF-kappaB protein complex) and NF-kappaB inhibitor-like protein 1 (NFKBIL1).

METHODS: The study was conducted in a cohort from the general population: The Child and Adolescent Twin Study in Sweden (CATSS, n = 12 319, 9-12 years old). The subjects were assessed by the Autism-Tics, ADHD, and Other Comorbidities Inventory. Five SNPs within the two genes were genotyped (NFKBIL1: rs2857605, rs2239707, rs2230365 and rs2071592; NFKB1: rs4648022).

RESULTS: We found significant associations for two SNPs in NFKBIL1: rs2239707 showed a significant distribution of genotype frequencies in the case-control analysis both for all individuals combined and in boys only, and rs2230365 was significantly associated with the ALTs-module language impairment in boys only. Furthermore, we found nominal association in the case-control study for rs2230365, replicating earlier association between this SNP and ASD in an independent genome-wide association study.

CONCLUSION: The shown associations between polymorphisms in NFKBIL1 and ALTs are supporting an influence of the immune system on neuropsychiatric symptoms

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Actas Esp Psiquiatr. 2019 Jul;47:158-64.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND LIFESTYLE HABITS IN CHILDREN AND ADOLESCENTS.

Parraga JL, Calleja PB, Lopez-Martin S, et al.

INTRODUCTION: Attention-deficit/hyperactivity disorder (ADHD) is one of the most prevalent disorders in the child and adolescent population, with a known impact on learning, social relations and quality of life. However, the lifestyle habits of patients with this disorder have been poorly studied.

MATERIAL AND METHODS: A total of 160 children and adolescents, aged between 6 and 16 years, participated in the study. Half of them were treatment-naive patients with a clinical diagnosis of ADHD according to DSM-IV-TR criteria, and without comorbidities. The remaining 80 participants were typically developing (TD) controls without known neurodevelopmental or psychiatric disorders. Parents of all participants completed a questionnaire about their children s lifestyle habits (e.g, daily hours of sleep, media use and study).

RESULTS: The groups had a similar socioeconomic background and did not differ with respect to age and sex distribution. However, patients with ADHD spent more time than TD children studying, and less time watching TV, playing video games, using computers and playing with other people. They also slept fewer hours per night than children and adolescents with TD. ADHD and TD groups spent similar time reading, listening to music and playing sports.

CONCLUSIONS: The results of this study suggest that children and adolescents with ADHD have different lifestyle habits compared to age- and sex-matched controls. These findings are not explained by comorbid disorders or medication/ psychological treatment

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Aerosp Med Hum Perform. 2019 Sep;90:788-91.

SUCCESS RATES AT AN AIR FORCE PILOT ACADEMY AND ITS RELATION TO METHYLPHENIDATE USE.

Sarfati S, Nakdimon I, Tsodyks J, et al.

BACKGROUND: Attention deficit hyperactivity disorder (ADHD) is a chronic neurological disorder characterized by persistent patterns of inattention, impulsivity, and hyperactivity. The most common treatment for this disorder is methylphenidate, which is a disqualifying medication for flight. Candidates with

previous use of methylphenidate are not necessarily disqualified from the Israeli Air Force (IAF) flight academy.
METHODS: Flight cadets from 12 consecutive flight courses who have used methylphenidate at least once in the past were identified according to their medical records. The graduation ratio of cadets with previous use of methylphenidate was compared with that of the rest of the cadets. A comparison was also made with regard to the causes of disqualification from the flight course. Statistical significance was assessed using the Fischer Test.
RESULTS: Among the 90 flight cadets who have used methylphenidate, only 2 (2.2%) successfully graduated from the IAF flight academy. Among the 2983 flight cadets who have no history of methylphenidate use, 461 (15.4%) successfully graduated. We found no significant differences in the disqualification causes between the two groups.
CONCLUSION: The IAF flight academy graduation rate was meaningfully and significantly lower among cadets who reported previous use of methylphenidate. The study design, however, limits the inference of causal relationship.Sarfati S, Nakdimon I, Tsodyks J, Assa A, Gordon B. Success rates at an air force pilot academy and its relation to methylphenidate use

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Am Fam Physician. 2019 Mar;99:376-82.
RIGHT CARE FOR CHILDREN: TOP FIVE DO'S AND DON'TS.
Schefft M, Schroeder AR, Liu D, et al.
Underuse and overuse of medical interventions, failure to use interventions known to be effective, and provision of tests or interventions in which benefits do not exceed harms are types of low-value care. The Lown Institute's Right Care Alliance Children's Health Council identified five "do" recommendations that highlight underuse and five "don't" recommendations that highlight overuse in children's health care. The five "do" recommendations include: do provide access to long-acting reversible contraception for adolescents, do use nonpharmacologic interventions first for treatment of attention-deficit/hyperactivity disorder, do discuss quality of life for children with complex medical conditions using a shared decision-making model and access resources such as palliative care subspecialists, do promote childhood literacy development by providing free, age-appropriate books in clinical settings, and do screen for socioeconomic status of the patient and family and provide access to community health and wellness resources. The five "don't" recommendations include: don't routinely prescribe antibiotics in children two to 12 years of age with a middle ear infection, don't perform computed tomography of the head for children with minor head trauma, don't use albuterol in children with bronchiolitis, don't routinely screen for hyperlipidemia in children and adolescents, and don't routinely perform preparticipation sports evaluations. These 10 examples of underuse and overuse were identified with the intent of improving health care value and promoting "Right Care."

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Anadolu Psikiyatr Derg. 2020;21:211-17.
THE EFFECTS OF METHYLPHENIDATE ON WEIGHT, HEIGHT, AND BODY MASS INDEX IN TURKISH CHILDREN AND ADOLESCENTS WITH ADHD.
Turan S, Pekcanlar AA.
Objective: The pathophysiological mechanisms underlying the effects of psychostimulants (methylphenidate) treatment on growth still remain controversial. We examined the long term effects of methylphenidate on height, weight and body mass index in Turkish children and adolescents with attention deficit hyperactivity disorder (ADHD).
Methods: Participants (6-18 years, 330 boys, 103 girls) diagnosed with ADHD who received treatment with methylphenidate for at least 1 year at the Department of Child and Adolescent Psychiatry at Dokuz Eyll University Medical School were included in a retrospective study. Weight, height, and BMI z scores were converted to age-and gendercorrected z scores using norms from the Turkish population at baseline and last follow-up.

Results: Height and weight standard deviation score (SDS) were reduced by treatment (baseline height-SDS [SDS]: 0.74-¦1.43, followup height-SDS [SDS]:-0.67-¦4.35, t-test p<0.001; baseline weight SDS [SDS]: 0.61-¦1.28, and follow-up weightSDS [SDS]:-0.41-¦0.76, t-test p<0.001). There were no differences in BMI-SDS before and after stimulant treatment (baseline BMI-SDS [SDS]: 0.27-¦1.21, follow-up BMI-SDS [SDS]:-0.20-¦4.54, t-test p=0.353). However, considering whether patients were children (6-12 years) or adolescents (13-18 years) when they started medication, in the group of children, height and BMI was affected by treatment (baseline height-SDS [SDS]: 0.87-¦1.42; follow-up heightSDS [SDS]:-0.78-¦4.81]; p=0.002; baseline BMI-SDS [SDS]: 0.29-¦1.19; follow-up BMI-SDS [SDS]:-0.21-¦0.69; p<0.001). Results of multiple linear regression analysis which assess the possible contribution of the different treatment-related factors, only age starting treatment (B=-0.039, p=0.011) predicted final weight.
Conclusions: We conclude that methylphenidate shows a negative effect on height and BMI in children. It was thought that the findings obtained at the end of the study might be helpful in assessing the growth parameters that may facilitate the course of the ADHD, and in the improvement of more efficient and permanent treatment approaches, and the adherence of patients to the treatment

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Anadolu Psikiyatr Derg. 2020;21:222-24.

ATOMOXETINE-INDUCED URINARY RETENTION: A CASE REPORT.

Turan B, Dursun OB, Esin, et al.

Atomoxetine is one of the first-line treatments for attention deficit and hyperactivity disorder (ADHD) and is a nonpsychotic drug that reduces noradrenalin reuptake by selectively inhibiting presynaptic noradrenaline transporter. This agent, which has a good history of security, rarely produces side effects related to the urinary system. Although this rare side effect has been mentioned previously in the adults using atomoxetine, this effect is not fully known in children and adolescents. Until today, there are only four cases in the literature related to this subject. This case report will mention about the acute urinary retention, which is thought to be induced by the drug used, in a 7-yearold patient receiving atomoxetine treatment due to ADHD

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Appl Neuropsychol Adult. 2019 Sep;26:411-40.

A SITUATION-SPECIFIC APPROACH TO MEASURE ATTENTION IN ADULTS WITH ADHD: THE EVERYDAY LIFE ATTENTION SCALE (ELAS).

Groen Y, Fuermaier ABM, Tucha L, et al.

This study describes the development and utility of a new self-report measure of attentional capacities of adults with Attention Deficit Hyperactivity Disorder (ADHD): the Everyday Life Attention Scale (ELAS). Different from previous attention scales, attentional capacities are rated for nine everyday situations. Study 1 investigated the factor structure, validity, and reliability of the ELAS in 1206 healthy participants. Confirmatory factor analysis supported a situation-specific approach which categorizes everyday attention into nine situation scales: Reading, Movie, Activity, Lecture, Conversation, Assignment, Cooking, Cleaning up, and Driving. Each scale was composed of ratings for sustained, focused, selective, and divided attention as well as motivation, and had good internal consistency. Most scales showed weak correlations with ADHD Symptoms, Executive Functioning, and Memory Efficacy. Study 2 further investigated the sensitivity of the ELAS in 80 adults with ADHD compared to matched healthy controls and a mixed clinical group of 56 patients diagnosed with other psychiatric disorders. Compared to healthy controls, patients with ADHD reported reduced attentional capacities with large effect sizes on all situation scales and had a substantially higher number of situations with impaired attention scores. The ELAS may become useful in the clinical evaluation of ADHD and related psychiatric disorders in adults

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Arch Dis Child. 2019.

PATTERNS OF LONG-TERM ADHD MEDICATION USE IN AUSTRALIAN CHILDREN.

Efron D, Mulraney M, Sciberras E, et al.

Objective: Adherence to attention-deficit/hyperactivity disorder (ADHD) medication treatment is often suboptimal. This can compromise patient outcomes. We aimed to describe the patterns of ADHD medication use in Australian children, and characteristics associated with patterns of use.

Design: Dispensing data were analysed for all redeemed prescriptions of methylphenidate, dexamphetamine and atomoxetine between May 2002 and March 2015 from waves 1 to 6 of the Longitudinal Study of Australian Children (n=4634, age 4-5 years at wave 1). Medication coverage was defined as the proportion of time between the first and the last redeemed prescriptions in which the child was taking medication. Associations between predictor variables (child sex, ADHD symptom severity, age at first prescription, family socioeconomic status (SES), single parent status, parent education and parent mental health) and medication coverage were examined using regression analyses.

Results: 166 (3.6%) children had ever redeemed a prescription for an ADHD medication. Boys had higher odds of having taken ADHD medication than girls (OR=3.9; 95% CI 2.7 to 5.7). The mean medication coverage was 59.8%. Medication coverage was lower in children from families of lower SES (+¦=4.0; 95% CI 0.2 to 7.8, p=0.04). Medication coverage was relatively high in the first year of prescription, then decreased progressively, only increasing again after 5 or 6 years of treatment.

Conclusions: Children with ADHD from socially disadvantaged families were less likely to receive medication consistently. Prescribers need to continue to support families over many years to ensure medication is used consistently for children with ADHD

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Artificial Intelligence in Medicine. 2020;103.

ADHD CLASSIFICATION BY DUAL SUBSPACE LEARNING USING RESTING-STATE FUNCTIONAL CONNECTIVITY.

Chen Y, Tang Y, Wang C, et al.

As one of the most common neurobehavioral diseases in school-age children, Attention Deficit Hyperactivity Disorder (ADHD) has been increasingly studied in recent years. But it is still a challenge problem to accurately identify ADHD patients from healthy persons. To address this issue, we propose a dual subspace classification algorithm by using individual resting-state Functional Connectivity (FC). In detail, two subspaces respectively containing ADHD and healthy control features, called as dual subspaces, are learned with several subspace measures, wherein a modified graph embedding measure is employed to enhance the intra-class relationship of these features. Therefore, given a subject (used as test data) with its FCs, the basic classification principle is to compare its projected component energy of FCs on each subspace and then predict the ADHD or control label according to the subspace with larger energy. However, this principle in practice works with low efficiency, since the dual subspaces are unstably obtained from ADHD databases of small size. Thereby, we present an ADHD classification framework by a binary hypothesis testing of test data. Here, the FCs of test data with its ADHD or control label hypothesis are employed in the discriminative FC selection of training data to promote the stability of dual subspaces. For each hypothesis, the dual subspaces are learned from the selected FCs of training data. The total projected energy of these FCs is also calculated on the subspaces. Sequentially, the energy comparison is carried out under the binary hypotheses. The ADHD or control label is finally predicted for test data with the hypothesis of larger total energy. In the experiments on ADHD-200 dataset, our method achieves a significant classification performance compared with several state-of-the-art machine learning and deep learning methods, where our accuracy is about 90 % for most of ADHD databases in the leave-one-out cross-validation test

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Asia Pac Psychiatry. 2019 Sep;11:e12351.
METHYLPHENIDATE ASSOCIATED VITILIGO IN A CHILD: A CASE REPORT.
Guler AG, Akdere P, Toros F.

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Basic Clin Pharmacol Toxicol. 2019 Aug;125 Suppl 3:81-88.
PRE-NATAL BRAIN DEVELOPMENT AS A TARGET FOR URBAN AIR POLLUTION.
Sunyer J, Dadvand P.
Air pollution is the main urban-related environmental hazard and one of the major contributors to the global burden of disease based on its cardiovascular-respiratory impacts. In children, exposure to urban air pollution is associated, among others, with decelerated neurodevelopment early in life and increased risk of neurodevelopmental problems such as attention-deficit hyperactivity disorder, autism spectrum disorders, academic failure and the start of Alzheimer's pathogenesis. However, the evidence of the effects of air pollution on brain development is still inadequate, mainly due to the limitations in (a) characterizing brain development (most studies were based on subjective tools such as questionnaires or neuropsychological tests) and (b) air pollution exposure (most studies only used residential levels based on geographical modelling and also overlooking the variation in the mixture of air pollutants as well as the composition and hence toxicity of particulate pollutants in different settings), (c) the lack of studies during the most vulnerable stages of brain development (foetal and early life (first two years post-natally)) and (d) the lack of structural and functional imaging data underlying these effects. In mice, in utero exposure to fine particles was linked to structural brain changes and there is a need to establish the generalizability of these findings in human beings. Though scarce, current evidence in children supports the importance of the pre-natal period as a susceptible window of exposure. Two studies in schoolchildren found that pre-natal air pollution exposure might damage brain structure while exposure during childhood was not linked to any structural alteration. Another study showed that children with higher traffic-related air pollution at school had lower functional integration in key brain networks, but no changes in brain structure, possibly partly because of the time window of air pollution exposure (in utero versus childhood exposure). A key development is to discover the windows of greatest sensitivity of structural brain changes to air pollution exposure by incorporating the recent advances in non-invasive imaging to characterize natal and post-natal brain development and exploring whether and to what extend placental dysfunction could mediate such an association. Studying pre-natal life is important because effects at this time are of a potentially irreversible nature and because the largest preventive opportunities occur during these periods

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Behav Sleep Med. 2019 Nov;17:790-803.
MENTAL HEALTH DIAGNOSES AND SYMPTOMS IN PRESCHOOL AND SCHOOL AGE YOUTH PRESENTING TO INSOMNIA EVALUATION: PREVALENCE AND ASSOCIATIONS WITH SLEEP DISRUPTION .
Van Dyk TR, Becker SP, Byars KC.
Objective/Background: Sleep problems and emotional and behavioral difficulties are highly correlated in community samples of youth and in youth presenting to mental health treatment. However, fewer studies have characterized the associations between sleep and psychopathology symptoms in youth presenting to pediatric sleep clinics. This retrospective, cross-sectional study examined the prevalence of psychopathology symptoms and their associations with sleep disruption in youth presenting to a behavioral sleep medicine clinic.
Participants: Participants were 373 preschoolers (1.5 to 5 years old) and 300 school age youth (6 to 10 years old) presenting to a pediatric behavioral sleep medicine clinic with a primary insomnia diagnosis.
Methods: As a part of routine clinical care, parents completed a battery of pre-evaluation measures assessing insomnia severity, sleep disturbance, history of mental health diagnosis, and psychopathology symptoms.
Results: Both preschool and school age youth had high rates of parent-reported mental health diagnoses (35% and 74%, respectively) and clinically elevated psychopathology symptoms (69% of preschoolers and

77% of school age youth) at initial insomnia evaluation. These symptoms were significantly associated with sleep disruption, with ADHD and affective problems most consistently associated with sleep problems in preschoolers and symptoms of anxiety, affective, and behavioral problems most consistently associated with sleep problems in school age youth.
Conclusions: Psychopathology symptoms should be regularly assessed in youth presenting to behavioral sleep medicine clinics. Further, the role of psychopathology should be considered in insomnia conceptualization and treatment and, when appropriate, psychopathology symptoms should be targeted in treatment or appropriate referrals should be made

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Behav Brain Res. 2020;381.
FRONTAL VOLUME AS A POTENTIAL SOURCE OF THE COMORBIDITY BETWEEN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND READING DISORDERS.
Kibby MY, Dyer SM, Lee SE, et al.
Prefrontal volume reductions commonly are demonstrated in ADHD, but the literature examining prefrontal volume in reading disorders (RD) is scant despite their also having executive functioning (EF) deficits. Furthermore, only a few anatomical studies have examined the frontal lobes in comorbid RD/ADHD, though they have EF deficits similar to RD and ADHD. Hence, we examined frontal gyri volume in children with RD, ADHD, RD/ADHD and controls, as well as their relationship to EF for gyri found to differ between groups. We found right inferior frontal (RIF) volume was smaller in ADHD, and smaller volume was related to worse behavioral regulation. Left superior frontal (LSF) volume was larger in RD than ADHD, and its size was negatively related to basic reading ability. Left middle frontal (LMF) volume was largest in RD/ADHD overall. Further, its volume was not related to basic reading nor behavioral regulation but was related to worse attentional control, suggesting some specificity in its EF relationship. When examining hypotheses on the etiology of RD/ADHD, RD/ADHD was commensurate with ADHD in RIF volume and both RD and ADHD in LSF volume (being midway between the groups), consistent with the common etiology hypothesis. Nevertheless, they also had an additional gyrus affected: LMF, consistent with the cognitive subtype hypothesis in its specificity to RD/ADHD. The few other frontal aMRI studies on RD/ADHD supported both hypotheses as well. Given this, future research should continue to focus on frontal morphology in its endeavors to find neurobiological contributors to the comorbidity between RD and ADHD

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Biol Psychiatry Cogn Neurosci Neuroimaging. 2019 Mar;4:243-50.
POLYGENIC SCORES FOR NEUROPSYCHIATRIC TRAITS AND WHITE MATTER MICROSTRUCTURE IN THE PEDIATRIC POPULATION.
Jansen PR, Muetzel RL, Polderman TJC, et al.
BACKGROUND: Genome-wide association studies have identified numerous genetic variants that predispose to neuropsychiatric traits. Identification of mechanisms in the brain that underlie these associations is essential for understanding manifestations of genetic predisposition within the general population. Here, we investigated the association between polygenic scores (PGSs) for seven neuropsychiatric traits and white matter microstructure of the brain on diffusion tensor imaging in the pediatric population.
METHODS: Participants from the Generation R Study who had genotype and diffusion tensor imaging data available (n = 1138, mean age = 10.2 years, range = 8.7-12.0) were included. PGSs were calculated for five psychiatric disorders (attention-deficit/hyperactivity disorder, bipolar disorder, autism, major depressive disorder, and schizophrenia) and two cognitive traits (intelligence and educational attainment) and were tested for associations with global and tract-specific fractional anisotropy (FA) and mean diffusivity.
RESULTS: Significant positive associations with global FA were observed for the PGSs of intelligence (beta = .109, SE = .029, p < .001, DeltaR(2) = .012) and educational attainment (beta = .118, SE = .029, p < .001, DeltaR(2) = .014). No significant associations were observed with FA for the PGSs of psychiatric disorders.

Tract-specific analysis showed that the PGSs for intelligence and educational attainment were associated with FA of several association and projection fibers of the brain.
CONCLUSIONS: Our results show that genetic predisposition for cognition-related traits, but not for psychiatric disorders, is associated with microstructural diffusion measures of white matter tracts at an early age. These results suggest a shared genetic etiology among structural connectivity, intelligence, and educational achievement

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Biol Psychiatry. 2020.
HETEROGENEITY AND SUBTYPING IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER□ÇöCONSIDERATIONS FOR EMERGING RESEARCH USING PERSON-CENTERED COMPUTATIONAL APPROACHES.
Karalunas SL, Nigg JT.
Few if any experts believe that existing psychiatric diagnostic categories included in DSM and ICD are actually discrete disease entities. Attention-deficit/hyperactivity disorder (ADHD) is emblematic of the problems in the existing psychiatric classification system. ADHD symptoms reliably cluster into two correlated dimensions in factor analysis. However, children with ADHD vary considerably in their symptom profiles, symptom trajectories, clinical outcomes, and biological and psychological correlates. Thus, the field has sought alternative approaches that harness the dimensions of emotional, cognitive, and behavioral functioning that underlie ADHD and other existing psychiatric categories to create informative phenotypes that improve clinical prediction and clarify etiology. Within ADHD, cognitive (neuropsychological) and temperament/personality features have received considerable attention. In some cases, subphenotypes based on these features appear to improve on existing classifications and could eventually be translated into clinical practice. This review summarizes findings from subphenotyping efforts in ADHD that use cognitive, emotion-related, and other features to highlight major considerations for research applying person-oriented approaches to inform an improved psychiatric nosology. Considerations related to feature selection, validation of newly proposed divisions, defining populations of interest, and incorporating a developmental perspective are discussed

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Biol Psychiatry. 2020.
MEDICATION FOR ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND RISK FOR SUICIDE ATTEMPTS.
Chang Z, Quinn PD, O'Reilly L, et al.
Background: Attention-deficit/hyperactivity disorder (ADHD) is a risk factor for suicidal behavior, but the effect of ADHD medication on suicidal behavior remains unclear. This study aimed to examine the associations between medication treatment for ADHD and risk of suicide attempts.
Methods: We identified a large cohort of patients with ADHD (N = 3,874,728, 47.8% female patients) using data from commercial health care claims from 2005 to 2014 in the United States. We used population-level and within-individual analyses to compare risk of suicide attempts during months when individuals received prescribed stimulant or nonstimulant medication relative to months when they did not receive medication.
Results: In both population-level and within-individual analyses, ADHD medication was associated with lower odds of suicide attempts (odds ratio [OR], 0.69; 95% confidence interval [CI], 0.66-0.73; and OR, 0.61; 95% CI, 0.57-0.66, respectively). Similar reductions were found in children to middle-aged adults and in clinically relevant subgroups, including patients with ADHD with preexisting depression or substance use disorder. The reduction was mainly seen for stimulant medication (OR, 0.72; 95% CI, 0.66-0.77); nonstimulant medication was not associated with statistically significant changes in risk of suicide attempts (OR, 0.94; 95% CI, 0.74-1.19). Sensitivity analyses assessing the influence of different exposure definitions, different outcome definitions, subsets of the cohort, and different analytic approaches provided comparable results.

Conclusions: Stimulant medication was associated with a reduced risk of suicide attempts in patients with ADHD, and nonstimulant medication is unlikely to increase the risk of suicide attempts

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BMC Med Genomics. 2019 Mar;12:51.

FAMILIAL INHERITANCE OF THE 3Q29 MICRODELETION SYNDROME: CASE REPORT AND REVIEW .

Khan WA, Cohen N, Scott SA, et al.

BACKGROUND: The chromosome 3q29 microdeletion syndrome is characterized by a clinical phenotype that includes behavioral features consistent with autism and attention deficit hyperactivity disorder, mild to moderate developmental delay, language-based learning disabilities, and/or dysmorphic features. In addition, recent data suggest that adults with chromosome 3q29 microdeletions have a significantly increased risk for psychosis and neuropsychiatric phenotypes.

CASE PRESENTATION: We report a 3-year-old male with global developmental delay, anemia, and mild dysmorphic facial features. Clinical chromosomal microarray (CMA) testing of the proband detected a heterozygous 1.21 Mb deletion at chromosome 3q29, consistent with a diagnosis of the 3q29 microdeletion syndrome. Interestingly, subsequent parental testing determined that the pathogenic deletion was inherited from his otherwise healthy mother who had a history of learning disabilities. The chromosome 3q29 microdeletion was not detected in the healthy older sibling of the proband by CMA testing, nor was it prenatally detected in a subsequent maternal pregnancy.

CONCLUSION: Our report highlights the 3q29 microdeletion syndrome as an illustrative example of the importance of a molecular diagnosis for families that harbor pathogenic copy number aberrations with variable expressivity, in particular those that also impart an increased risk for adult onset neuropsychiatric phenotypes

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BMC Psychiatry. 2019 Dec;19.

IN TRANSITION WITH ADHD: THE ROLE OF INFORMATION, IN FACILITATING OR IMPEDING YOUNG PEOPLE'S TRANSITION INTO ADULT SERVICES.

Price A, Newlove-Delgado T, Eke H, et al.

Background: Many national and regional clinical guidelines emphasise the need for good communication of information to young people and their parent/carers about what to expect during transition into adult services. Recent research indicates only a minority of young people in need of transition for Attention Deficit Hyperactivity Disorder (ADHD) experience continuity of care into adulthood, with additional concerns about quality of transition. This qualitative study explored the role that information plays in experiences of transition from the perspectives of parent/carers and young people.

Methods: Participants were recruited from 10 National Health Service Trusts, located across England, with varying service configurations. Ninety two qualitative interviews were conducted: 64 with young people with ADHD at different stages relative to transition, and 28 with parent/carers. Thematic analysis of data was completed using the Framework Method.

Results: Interviewees reported a range of experiences; however reliance on parent/carers to gather and translate key information, and negative experiences associated with poor communication of information, were universal. Three themes emerged: Navigating information with help from parents; Information on ADHD into adulthood; Information about the transition process. The first revealed the essential role of parent in the translation and application of information, the other two explored distinct types of information necessary for a smooth transition. Interviewees made recommendations for clinical practice similar to UK (United Kingdom) National Institute for Health and Care Excellence (NICE) guidelines, with an additional emphasis on providing nuanced information on ADHD as a potentially long term condition. It was important to interviewees that General Practitioners had a basic understanding of adult ADHD and also had access to information about service provision.

Conclusions: Our findings illustrate that the availability and communication of information to young people and their parent/carers is an essential component of the transition process between child and adult ADHD

services. How and when it is provided may support or impede transition. This study constitutes a substantial contribution to the evidence base, drawing on interviews from a range of participants across England and from Trusts offering different types of services

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BMC Res Notes. 2019 Aug;12:524.

PRIMARY SCHOOL TEACHERS' MISCONCEPTIONS ABOUT ATTENTION DEFICIT/HYPERACTIVITY DISORDER IN NEKEMTE TOWN, OROMIA REGION, WESTERN ETHIOPIA.

Woyessa AH, Tharmalingadevar TP, Upashe SP, et al.

OBJECTIVE: Teachers' misconception on Attention Deficit/Hyperactivity Disorder (ADHD) in general and the implementation of effective educational strategies for children with this problem in particular is one obstacle that largely impacts the academic and overall success of school children with this problem. In Ethiopia, despite there are thousands of school children with this ADHD, no studies have been conducted to examine school teachers' understanding about problem. This research was therefore aimed to investigate primary school teachers' misconceptions about ADHD in Western Ethiopia.

RESULT: In this study, 76.2% of respondents had misconception on general awareness of ADHD. More than half (62.7%) of them had misconceptions on the diagnosis and on 81% had misconceptions regarding treatment of the problem. Concerning teachers' misconception on the contemporarily recommended educational placement of students with ADHD, 141 (68.3%) have said that such students should be placed in part time special education. The findings of this research have clearly indicated that primary school teachers have a wide range of misconceptions about the ADHD. It also reflects the need of equipping teachers with basic knowledge of ADHD which also enables them provide effective support for students with this exceptionality

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BMJ Open. 2020;10.

FACT: A RANDOMISED CONTROLLED TRIAL TO ASSESS THE FEASIBILITY OF QBTEST IN THE ASSESSMENT PROCESS OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) FOR YOUNG PEOPLE IN PRISON -A FEASIBILITY TRIAL PROTOCOL.

Lennox C, Hall CL, Carter L-A, et al.

Introduction The prevalence of attention deficit hyperactivity disorder (ADHD) within the Children and Young People Secure Estate (CYPSE) is much higher than seen in the general population. To make a diagnosis of ADHD, clinicians draw on information from multiple sources, including parents and teachers. However, obtaining these is particularly difficult for young people in the secure estate. There is increasing evidence in the community that QbTest is able to assist in the accurate and earlier diagnosis of ADHD. The objective of this study is to assess the feasibility and acceptability of QbTest in the assessment of ADHD within the CYPSE.

Methods and analysis A single-centre parallel group feasibility randomised controlled trial will be conducted. Sixty young people within the CYPSE identified as displaying possible symptoms of ADHD will be randomised to the intervention arm (n=30; QbTest plus usual care) or control arm (n=30; usual care). Primary analyses will be descriptive and a process evaluation will be conducted to assess the contexts involved in implementing the intervention. Interviews will be conducted to explore acceptability and thematic analysis will be used to analyse the data.

Ethics and dissemination This study was approved by National Health Service Wales research ethics committee 3 (18/WA/0347) on 15 February 2019. The findings will be published in peer-reviewed journals, presented at relevant conferences and disseminated to the public via summaries cocreated with our patient and public involvement group. Trial registration number ISRCTN17402196

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Br J Dev Psychol. 2019 Jun;37:300-07.

PREDICTING CHILDREN'S SCHOOL GRADES: UNIQUE AND INTERACTIVE EFFECTS OF PARENTAL BELIEFS AND CHILD INATTENTION/HYPERACTIVITY SYMPTOMS.

Ferretti N, Ganley CM, Kofler MJ.

Parental beliefs about school involvement are key in predicting individual differences in children's academic success. The current study examined unique and interactive relations between parental beliefs and child inattention/hyperactivity symptoms in predicting children's achievement. Participants (N = 348) were caregivers of children aged 8-12. Caregivers completed questionnaires regarding their beliefs and their child's inattention/hyperactivity and achievement. Hierarchical regression analyses indicated lower child inattention/hyperactivity and greater parental confidence in their ability to help their child academically predicted better achievement. Parent/child interactions probed with simple slopes suggested an achievement gap for children with higher inattention/hyperactivity only when their parents felt less efficacious or more responsible for their child's academic success. This suggests parent self-efficacy may buffer the negative relation between children's inattention/hyperactivity symptoms and underachievement, and parents of children with higher inattention/hyperactivity may increasingly assume responsibility for their success due to feedback from the school. Statement of contribution What is already known on this subject? Academic achievement predicts several short- and long-term outcomes for children. Parental involvement beliefs are multi-faceted and predict children's academic success. Child inattention/hyperactivity symptoms are related to lower academic achievement. What does this study add? It provides specificity of previous relations for children with a range of inattention/hyperactivity symptoms. It identifies parental self-efficacy as a promising moderator of the relation between child behaviour and academics. It provides a preliminary evidence base for future work on the role of parental beliefs in child academic outcomes

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Brain Dev. 2019 Sep;41:662-70.

EVENT-RELATED POTENTIALS AND BEHAVIOR PERFORMANCE SCORES IN CHILDREN WITH SLEEP-DISORDERED BREATHING.

Kaihua J, Yang Y, Fangqiao Z, et al.

OBJECTIVE: To explore impaired cognition characteristics and abnormal behavior in children with Sleep-Disordered Breathing (SDB) via Event-Related Potentials (ERPs), continuous performance testing (CPT), and the Child Behavior Checklist (CBCL).

METHODS: A total of 108 children aged 6-8years old were recruited, including fifty-four children (28 boys) with SDB and fifty-four normal children (28 boys). CBCL and Chinese version of the OSA-18 questionnaire were administered. Nineteen children with SDB (OSA-18 questionnaire value >60) and Nineteen normal children completed a CPT task. ERP was extracted using the BESA software.

RESULTS: No significant differences in the correct number, reaction time, or the number of commission error were noted between the CPT of the two groups (P>0.05). The ERP Go-P3 amplitudes at F3, Fz and F4 of the SDB group were significantly higher than those of the control group (P<0.05). The NoGo-N2 amplitudes at F3 and Fz of the SDB group were significantly lower than those of the control group (P<0.05). The Fz and F4 Go-P3 and FZ NoGo-P3 latency of the SDB group were significantly longer than those of the control group (P<0.05). However, among boys, the CBCL scores of the SDB group including the subscores, schizo, somatic complaints, compulsion, aggression, and hyperactivity, as well as the total score, were significantly higher than the control group (all P<0.05).

CONCLUSION: Children with SDB demonstrate significant functional deficits in regard to conflict monitoring, attention, and inhibition. The frontal region is the primary area of dysfunction, especially in the left brain region, and inhibition function dysfunction may be a common pathogenesis of SDB and ADHD. Moreover, boys with SDB may exhibit more behavior problems when compared to girls

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Brain Imaging Behav. 2020.

NEURAL NETWORK CONNECTIVITY IN ADHD CHILDREN: AN INDEPENDENT COMPONENT AND FUNCTIONAL CONNECTIVITY ANALYSIS OF RESTING STATE FMRI DATA.

Kumar U, Arya A, Agarwal V.

Resting-state functional magnetic resonance imaging (rsfMRI) is a novel approach that has the potential to examine abnormalities in the default mode network (DMN) component. Two different approaches were used in the present study to characterize the functional connectivities of various DMN components in 16 non-medicated ADHD and a similar number of TD (typically developing) children. rsfMRI data were analysed using independent component analysis (ICA) and region-of-interest (ROI) seed to voxel correlation analysis. ICA results indicated a strong coherence of the left dorsal anterior cingular cortex (dACC) with the DMN components in children with ADHD. In addition, seed-to-voxel functional connectivity analysis using the left dorsal anterior cingulate as a seed region suggested higher temporal coherence with other neural networks upon comparison with TD children. These results imply children with ADHD exhibit a higher dispersed resting state connectivity pattern in DMN and other networks

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Can J Psychiatry. 2020;65:36-45.

A PROSPECTIVE STUDY OF CHILDHOOD PREDICTORS OF TRAUMATIC BRAIN INJURIES SUSTAINED IN ADOLESCENCE AND ADULTHOOD.

Guberman GI, Robitaille M-P, Larm P, et al.

Objective: Traumatic brain injuries (TBIs) are sustained by approximately 17% of males in the general population, many of whom subsequently present mental disorders, cognitive, and physical problems. Little is known about predictors of TBIs and how to prevent them. The present study aimed to determine whether inattention-hyperactivity and/or all externalizing problems presented by boys at age 10 predict subsequent TBIs to age 34 after taking account of previous TBIs and family social status (FSS).

Method: 742 Canadian males were followed, prospectively, from age 6 to 34. Diagnoses of TBIs were extracted from health files, parents-reported sociodemographic and family characteristics at participants age 6, and teachers-rated participants behaviors at age 10. Separate logistic regression models predicted TBIs sustained from age 11 to 17 and from age 18 to 34. For each age period, two models were computed, one included previous TBIs, inattention-hyperactivity, FSS, and interaction terms, the second included previous TBIs, externalizing problems, FSS, and interaction terms.

Results: In models that included inattentionΓÇôhyperactivity, TBIs sustained from age 11 to 17 were predicted by age 10 inattentionΓÇôhyperactivity (odds ratio [OR] = 1.46, 1.05 to 2.05) and by TBIs prior to age 11 (OR = 3.50, 1.48 to 8.24); TBIs sustained from age 18 to 34 were predicted by age 10 inattentionΓÇôhyperactivity (OR = 1.31, 1.01 to 170). In models that included all externalizing problems, TBIs from age 11 to 17 were predicted by prior TBIs (OR = 3.66, 1.51 to 8.39); TBIs sustained from age 18 to 34 were predicted by age 10 externalizing problems (OR = 1.45, 1.12 to 1.86). Neither FSS nor interaction terms predicted TBIs in any of the models.

Conclusions: Among males, using evidence-based treatments to reduce inattention-hyperactivity and externalizing problems among boys could, potentially, decrease the risk of TBIs to age 34. Further, boys who sustain TBIs in childhood require monitoring to prevent recurrence in adolescence

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Cardiol Young. 2019.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS IN CHILDREN WITH SURGICALLY CORRECTED VENTRICULAR SEPTAL DEFECT, TRANSPOSITION OF THE GREAT ARTERIES, AND TETRALOGY OF FALLOT.

Holst LM, Kronborg JB, Jepsen JRM, et al.

Background: Children with complex CHD are at risk for psychopathology such as severe attention-deficit/hyperactivity disorder symptoms after congenital heart surgery.

Objective: The aim of this study was to investigate if children with Ventricular Septal Defect, Transposition of Great Arteries, or Tetralogy of Fallot have an increased occurrence of attention-deficit/hyperactivity

disorder symptoms compared with the background population and to investigate differences between the three CHDs in terms of occurrence and appearance of attention-deficit/hyperactivity disorder symptoms.
Method: A national register-based survey was conducted, including children aged 10-16 years with surgically corrected CHDs without genetic abnormalities and syndromes. The Attention-Deficit/Hyperactivity Disorder-Rating Scale questionnaires were filled in by parents and school teachers.
Results: In total, 159 out of 283 questionnaires were completed among children with CHDs and compared with age- and sex-matched controls. Children with CHDs had significantly increased inattention scores ($p = 0.009$) and total attention-deficit/hyperactivity disorder scores ($p = 0.008$) compared with controls. Post hoc analyses revealed that children with Tetralogy of Fallot had significantly higher inattention scores compared with children both with Ventricular Septal Defect ($p = 0.043$) and controls ($p = 0.004$).
Conclusion: Attention-deficit/hyperactivity disorder symptoms and inattention symptoms were significantly more frequent among children aged 10-16 years with CHDs, in particular in children with corrected Tetralogy of Fallot

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Child Dev. 2020 Jan;91:e77-e91.

EARLY CRYING, SLEEPING, AND FEEDING PROBLEMS AND TRAJECTORIES OF ATTENTION PROBLEMS FROM CHILDHOOD TO ADULTHOOD.

Bilgin A, Baumann N, Jaekel J, et al.

This study investigated if crying, sleeping or feeding problems that co-occur (multiple regulatory problems [RPs]) or are persistent predict attention problems and diagnoses of attention deficit hyperactivity disorder (ADHD) in childhood and adulthood. Participants were 342 individuals who were assessed at 5, 20, and 56 months for crying, sleeping, and feeding (RPs) and at 6, 8, and 28 years for ADHD diagnoses, attention problems, and attention span. Infants/toddlers with multiple/persistent RPs had an increased risk of receiving an ADHD diagnosis both in childhood and adulthood compared to those who never had RPs. Multiple/persistent RPs were further associated with a high-decreasing attention problems trajectory from childhood to adulthood. Interventions to alleviate early RPs may prevent the development of attention problems

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Clin Child Psychol Psychiatry. 2019 Jul;24:462-81.

IMPAIRMENTS IN RESOURCE ALLOCATION AND EXECUTIVE CONTROL IN CHILDREN WITH ADHD.

Dorrenbacher S, Kray J.

Children diagnosed with attention-deficit hyperactivity disorder (ADHD) show pronounced alterations in cognitive tasks, such as a highly variable mode of responding. There is an ongoing debate about the key driving mechanisms of such alterations (e.g. specific inhibition or working memory (WM) impairments or general impairments in the allocation of energetic resources). The aim of this study was to disentangle such process-specific versus general limitations in cognitive and energetic mechanisms in children with ADHD compared to typically developed (TD) children based on the performance in a task-switching paradigm. This paradigm allows for both a common measurement and a later segregation of different executive sub-processes. Task-switching performance, including performance variability, of 26 children diagnosed with combined-type ADHD (8-13 years) was compared against the performance of 26 age-matched/IQ-matched TD children. Results revealed that compared to TD children, ADHD-diagnosed children showed alterations in performance variability during task switching, both in general (indicating disturbances in resource allocation) and conditionally on WM demands (indicating a specific WM deficit). Hence, our study provides diagnostically relevant new insights into performance impairments in children with ADHD compared to TD children. Importantly, it seems mandatory to include information on performance variability when trying to phenotype alterations in cognitive performance in ADHD

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Clin Neurophysiol. 2019 Apr;130:445-53.

LATENT ERP COMPONENTS OF COGNITIVE DYSFUNCTIONS IN ADHD AND SCHIZOPHRENIA .

Kropotov JD, Pronina MV, Ponomarev VA, et al.

OBJECTIVE: The main goal was to assess common and specific deficits of cognitive control in (Attention Deficit Hyperactivity Disorder) ADHD and schizophrenia (SZ) using event-related potentials (ERPs).
METHOD: Behavioral and EEG data in cued GO/NOGO task were recorded in 132 healthy controls (HC) and age, gender and education matched 63 ADHD adults, and 68 SZ patients.
RESULTS: N2d wave in NOGO-GO contrast of ERPs did not differ between the groups while the P3d wave discriminated SZ group from two other groups. Latent components of ERPs were extracted by blind source separation method based on second-order statistics Kropotov et al. (2017) and compared between the groups. A counterpart of N2d wave of a frontally distributed latent component was smaller in SZ indicating a specific frontal dysfunction of conflict detection in SZ. Two centrally distributed P3 sub-components were reduced in both groups indicating a non-specific dysfunction of action inhibition operations in ADHD and SZ.
CONCLUSION: A pattern of specific and common dysfunctions in terms of latent ERP components shows a more complex picture of functional impairment in schizophrenia and ADHD in comparison to conventional N2/P3 ERP description.
SIGNIFICANCE: The latent component approach shows a functionally different pattern of cognitive control impairment in comparison to the conventional ERP analysis

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Clin EEG Neurosci. 2020.

DELAY MATURATION IN OCCIPITAL LOBE IN GIRLS WITH INATTENTION SUBTYPE OF ATTENTION-DEFICIT HYPERACTIVITY DISORDER.

Chang T-M, Yang R-C, Chiang C-T, et al.

Attention-deficit hyperactivity disorder (ADHD) is a common childhood neuropsychiatric disorder. Differences in the presentations of ADHD between boys and girls have been well established. Three subtypes of ADHD exist. In addition to sex difference, different mechanisms may underlie different subtypes. The present study enrolled 30 girls with the inattentive subtype of ADHD and 30 age-matched controls. Low-resolution electromagnetic tomography (LORETA) and instantaneous frequency were used to analyze electroencephalography (EEG) for investigating the brain area and EEG bands involved in girls with inattentive ADHD. We found that the instantaneous frequencies in all EEG channels in girls with ADHD were lower than those in controls. Alpha 2 was the only EEG band that showed significant difference in current density between the ADHD and control groups (P =.0014). In the entire brain area, the posterior cingulate cortex, cingulate gyrus, and precuneus demonstrated the most significant difference between the ADHD and control groups. Our results suggest that brain maturation delay in the posterior areas might result in the inattention subtype of ADHD. In addition, posterior cingulate cortex, cingulate gyrus, and precuneus may play a critical role in the pathogenesis of ADHD. Our study provides a new approach method and possible mechanism of girls with inattentive subtype ADHD

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Clin EEG Neurosci. 2020;51:114-20.

EEG THETA/BETA RATIO CALCULATIONS DIFFER BETWEEN VARIOUS EEG NEUROFEEDBACK AND ASSESSMENT SOFTWARE PACKAGES: CLINICAL INTERPRETATION.

Kerson C, deBeus R, Lightstone H, et al.

The quantitative electroencephalographic (QEEG) theta/beta power ratio (TBR) has been shown to have an association with attention-deficit hyperactivity disorder (ADHD), with a previous tacit assumption of equivalence across hardware and software systems. Therefore, the International Collaborative ADHD Neurofeedback (ICAN) randomized clinical trial used a fixed TBR ΓëÑ 4.5 cutoff as measured by the Thought Technology Monastra-Lubar Assessment Suite as an inclusion criterion, 1.5 SD above norms collected with that system. However, a difference was noted between the TBR calculated by that assessment suite and the TBR computed by EEGer, the neurofeedback software used for treatment, leading us to investigate the

discrepancy. The difference may arise from different calculation methods. This article explains and compares various computational methods used to calculate and display EEG values, including TBR, elucidating why the values are not equivalent across equipment and software programs. Two major sources of variance are (1) how spectral leakage at the ends of bands is handled and (2) whether voltages of bins within a band are first averaged and then squared to get bandwidth power or are first squared to get power (turning negative voltages into positive power) and then averaged to get the bandwidth power; the latter method results in higher band power. This article compares methods of computing the TBR. Biofeedback practitioners and investigators should be aware of the algorithms their systems use when interpreting TBRs and require normative comparison data collected with the same system

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Clin Pediatr. 2020.

A Comparison Study of Primary Care Utilization and Mental Health Disorder Diagnoses Among Children In and Out of Foster Care on Medicaid.

Keefe RJ, Van Horne BS, Cain CM, et al.

The purpose of this study was to compare the utilization of primary care services and presence of mental health disorder diagnoses among children in foster care to children on Medicaid not in foster care in a large health system. The data for this study were analyzed from a clinical database of a multipractice pediatric health system in Houston, Texas. The sample included more than 95 000 children covered by Medicaid who had at least one primary care visit during the 2-year study period. The results of the study demonstrated that children not in foster care had a greater number of primary care visits and the odds of having >3 visits were significantly lower for children in foster care with a mental health disorder diagnosis. Additionally, more than a quarter of children in foster care had a diagnosis of a mental health disorder, compared with 15% of children not in foster care

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Clin Pediatr. 2020.

Exploring Factors Influencing Medication Adherence From Initiation to Discontinuation in Parents and Adolescents With Attention Deficit Hyperactivity Disorder.

Khan MU, Aslani P.

This study explored factors influencing parentsΓÇÖ and adolescentsΓÇÖ decisions to initiate, continue, and discontinue medication for attention deficit hyperactivity disorder (ADHD). Three focus groups were conducted with parents (n = 23) of children with ADHD, and 2 with adolescents diagnosed with ADHD (n = 11). Parents and adolescents independently discussed the complexities surrounding their decisions to adhere to ADHD medication. ParentsΓÇÖ negative beliefs about medication (fear of side effects) discouraged them from initiating therapy. Once initiated, parents struggled in balancing the need to medicate (improvements in learning and behavior) and concerns (weight loss, perceived delayed development) about the medication. Parents who had more concerns about the medication were more in favor of discontinuation. For adolescents, the desire for self-expression without being medicated was the primary factor determining nonadherence and/or discontinuation of the medication. AdolescentsΓÇÖ medication-related concerns were relatively different from the parents. Phase- and group-specific interventions are required to improve medication adherence in people with ADHD

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Compr Psychiatry. 2019 Jan;88:57-64.

An exploration of concomitant psychiatric disorders in children with autism spectrum disorder.

Lecavalier L, McCracken CE, Aman MG, et al.

OBJECTIVE: We explored patterns of concomitant psychiatric disorders in a large sample of treatment-seeking children and adolescents with autism spectrum disorder (ASD).

METHODS: Participants were 658 children with ASD (age 3-17years; mean=7.2years) in one of six federally-funded multisite randomized clinical trials (RCT) between 1999 and 2014. All children were referred for hyperactivity or irritability. Study designs varied, but all used the Child and Adolescent Symptom Inventory or Early Childhood Inventory to assess Attention Deficit Hyperactivity Disorder (ADHD), Oppositional-Defiant Disorder (ODD), Conduct Disorder (CD), Anxiety Disorders, and Mood Disorders. In addition, several measures in common were used to assess demographic and clinical characteristics.
RESULTS: Of the 658 children, 73% were Caucasian and 59% had an IQ >70. The rates of concomitant disorders across studies were: ADHD 81%, ODD 46%, CD 12%, any anxiety disorder 42%, and any mood disorder 8%. Two or more psychiatric disorders were identified in 66% of the sample. Of those who met criteria for ADHD, 50% also met criteria for ODD and 46% for any anxiety disorder. Associations between types of concomitant disorders and a number of demographic and clinical characteristics are presented.
CONCLUSION: In this well-characterized sample of treatment-seeking children with ASD, rates of concomitant psychiatric disorders were high and the presence of two or more co-occurring disorders was common. Findings highlight the importance of improving diagnostic practice in ASD and understanding possible mechanisms of comorbidity

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Compr Psychiatry. 2019 Jan;88:65-69.

INTEGRATIVE ANALYSIS OF GENOME-WIDE ASSOCIATION STUDY AND CHROMOSOMAL ENHANCER MAPS IDENTIFIED BRAIN REGION RELATED PATHWAYS ASSOCIATED WITH ADHD.

Cheng B, Du Y, Wen Y, et al.

Attention deficit/hyperactivity disorder (ADHD) is among the most common childhood onset psychiatric behavioral disorders, and the pathogenesis of ADHD is still unclear. Utilizing the latest genome wide association studies (GWAS) data and enhancer map, we explored the brain region related biological pathways associated with ADHD. The GWAS summary data of ADHD was driven from a published study, involving 20,183 ADHD cases and 35,191 healthy controls. The brain-related enhancer map was collected from ENCODE and Roadmap Epigenomics (ENCODE+Roadmap) including 489,581 enhancers. Firstly, the chromosomal enhancer maps of four brain regions were aligned with the ADHD GWAS summary data in order to obtain enhancer SNPs. Then the significant enhancers SNPs were subjected to the gene set enrichment analysis (GSEA) for identifying ADHD associated gene sets. A total of 866 pathways and 4 brain tissues were analyzed in this study. We detected several candidate genes for ADHD, such as AHI1, ALG2 and DNM1. We also detected several candidate biological pathways associated with ADHD, such as Reactome SEMA4D in semaphorin signaling and Reactome NCAM1 interactions. Our findings may provide a novel insight into the complex genetic mechanism of ADHD

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Continuum (Minneap Minn). 2019 Aug;25:936-58.

TICS AND TOURETTE SYNDROME.

Singer HS.

PURPOSE OF REVIEW: The purpose of this article is to present current information on the phenomenology, epidemiology, comorbidities, and pathophysiology of tic disorders and discuss therapy options. It is hoped that a greater understanding of each of these components will provide clinicians with the necessary information to deliver thoughtful and optimal care to affected individuals.
RECENT FINDINGS: Recent advances include the finding that Tourette syndrome is likely due to a combination of several different genes, both low-effect and larger-effect variants, plus environmental factors. Pathophysiologically, increasing evidence supports involvement of the cortical-basal ganglia-thalamocortical circuit; however, the primary location and neurotransmitter remain controversial. Behavioral therapy is first-line treatment, and pharmacotherapy is based on tic severity. Several newer therapeutic agents are under investigation (eg, valbenazine, deutetrabenazine, cannabinoids), and deep brain stimulation is a promising therapy.

SUMMARY: Tics, defined as sudden, rapid, recurrent, nonrhythmic motor movements or vocalizations, are essential components of Tourette syndrome. Although some tics may be mild, others can cause significant psychosocial, physical, and functional difficulties that affect daily activities. In addition to tics, most affected individuals have coexisting neuropsychological difficulties (attention deficit hyperactivity disorder, obsessive-compulsive disorder, anxiety, mood disorder, disruptive behaviors, schizotypal traits, suicidal behavior, personality disorder, antisocial activities, and sleep disorders) that can further impact social and academic activities or employment

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Cortex. 2020;124:176-87.

EXECUTIVE FUNCTION IN CHILDREN WITH TOURETTE SYNDROME AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: CROSS-DISORDER OR UNIQUE IMPAIRMENTS?

Openneer TJC, Forde NJ, Akkermans SEA, et al.

Findings of executive functioning deficits in Tourette syndrome (TS) have so far been inconsistent, possibly due to methodological challenges of previous studies, such as the use of small sample sizes and not accounting for comorbid attention-deficit/hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD), or medication use. We aimed to address these issues by examining several areas of executive functioning (response inhibition, attentional flexibility, cognitive control, and working memory) and psychomotor speed in 174 8-to-12-year-old children with TS [n = 34 without (TSÎêÆADHD) and n = 26 with comorbid ADHD (TS+ADHD)], ADHD without tics (ADHDÎêÆTS; n = 54), and healthy controls (n = 60). We compared executive functioning measures and psychomotor speed between these groups and related these to ADHD severity across the whole sample, and tic severity across the TS groups. Children with TS+ADHD, but not TS ADHD, made more errors on the cognitive control task than healthy children, while TS ADHD had a slower psychomotor speed compared to healthy controls. The ADHD group showed impairment in cognitive control and working memory versus healthy controls. Moreover, higher ADHD severity was associated with poorer cognitive control and working memory across all groups; there was no relation between any of the executive functioning measures and tic severity. OCD severity or medication use did not influence our results. In conclusion, we found little evidence for executive function impairments inherent to TS. Executive function problems appear to manifest predominantly in relation to ADHD symptomatology, with both cross-disorder and unique features of neuropsychological functioning when cross-comparing TS and ADHD

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Eas As A Psyc. 2019;29:118-23.

ADULT ATTENTION DEFICIT HYPERACTIVITY DISORDER IN A MALAYSIAN FORENSIC MENTAL HOSPITAL: A CROSS-SECTIONAL STUDY.

Woon LSC, Zakaria H.

Objective: To determine the prevalence of adult attention deficit hyperactivity disorder (ADHD) and comorbid mental disorders in a Malaysian forensic mental hospital.

Methods: All adult patients admitted to the forensic wards who were able to understand Malay or English language and give written informed consent were included. Participants were assessed using the Conners Adult Attention-Deficit Diagnostic Interview for DSM-IV (for presence of adult ADHD and a history of childhood ADHD) and the Mini International Neuropsychiatric Interview (for psychiatric comorbidities). Sociodemographic and offence-related data were also collected.

Results: Of 199 patients admitted, 120 were included for analysis. The mean age of participants was 36.3 years. 94.2% were men. 81.7% were single, divorced, or separated. 25% had a history of childhood ADHD. The prevalence of adult ADHD was 15.8%. The persistence rate was 63%. Among the 19 participants with adult ADHD, the most common psychiatric comorbidities were substance dependence (68.4%), lifetime depression (63.2%), and generalised anxiety disorder (47.4%). Compared with participants without ADHD, participants with adult ADHD were less likely to be married (0% vs 21.8%, p = 0.022) and more likely to have alcohol abuse (15.8% vs 2%, p = 0.028), lifetime manic/hypomanic episodes (42.1% vs 7.9%, p = 0.001),

and generalised anxiety disorder (47.4% vs 19.8%, p = 0.017), and were of younger age at first offence (21.8 years vs 26.9 years, p = 0.021).
Conclusions: Adult ADHD is common in a Malaysian forensic mental hospital and is associated with unmarried status, alcohol abuse, lifetime manic/hypomanic episodes, generalised anxiety disorder, and younger age at first offence

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Eas As A Psyc. 2019;29:124-28.
ASSOCIATION OF CHILDHOOD ATTENTION DEFICIT HYPERACTIVITY DISORDER SYMPTOMS WITH ACADEMIC AND PSYCHOPATHOLOGICAL OUTCOMES IN INDIAN COLLEGE STUDENTS: A RETROSPECTIVE SURVEY.
Jaisoorya TS, Desai G, Nair BS, et al.
Objective: To survey the prevalence of retrospectively recalled clinically significant symptoms of attention deficit hyperactivity disorder (ADHD) in childhood and determine the association of ADHD symptoms in childhood with current academic achievement and psychopathological outcomes among college students in the state of Kerala, India.
Methods: A self-administered questionnaire was distributed to 5784 students from 58 colleges selected by cluster random sampling. The Barkley Adult ADHD Rating Scale-IV was used for recollection of childhood ADHD symptoms; a total score of ^60 (indicating the 99 percentile) was taken as the cut-off for clinically significant ADHD symptoms in childhood. The Alcohol, Smoking and Substance Involvement Screening Test was used to assess lifetime use of alcohol and tobacco. The Kessler Psychological Distress Scale was used to assess'non-specific psychological distress. Lifetime suicidality and exposure to sexual abuse were assessed by asking relevant questions. Students who recalled having clinically significant ADHD symptoms in childhood were compared with those who did not.
Results: Of 5784 students, 639 (11.5%) did not complete the questionnaire. Of the remaining 5145 students, 1750 (34.8%) were men and 3395 (65.2%) were women, with a mean age of 19.4 years. 143 (2.8%) students reported clinically significant ADHD symptoms in childhood. Childhood ADHD symptoms were significantly more common in men and in those living in urban areas. In the bivariate analysis, those with clinically significant ADHD symptoms in childhood had significantly higher odds of poorer academic performance, alcohol use, tobacco use, psychological distress, suicidal thoughts, suicidal attempts, and contact and non-contact sexual abuse, after adjusting for sex and residence.
Conclusions: Clinical evaluation and appropriate management may be warranted for adults who retrospectively recall clinically significant ADHD symptoms in childhood

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Epidemiol Psychiatr Sci. 2020 Jan;29:e87.
TRANSITIONAL CARE FOR YOUNG ADULTS WITH ADHD: TRANSFORMING POTENTIAL UPHEAVAL INTO SMOOTH PROGRESSION.
Ford T.
Increasing numbers of young adults need continued support for their attention deficit hyperactivity disorder (ADHD) beyond the age-boundary for children's services. The sparse literature on transition in general suggests patchy provision and huge gaps in transitional care, but also that young people with ADHD and other neurodevelopmental disorders fair particularly badly. Transition in health care coincides with many other important life-transitions while the difficulties associated with ADHD may make these challenges particularly hard to cope with. Parents or other advocates therefore often need to be involved, which can present problems in adult mental health services given that they tend to be less family oriented than children's services. Importantly, young people need help negotiating the transition from passive recipient of care to active self-management, and in building relationships with the adult team.In addition to patchy provision of adult ADHD services, transition is currently hampered by poor understanding of ADHD as a long term condition and uncertain knowledge of what services are available among young people and parents as well as the clinicians working with them. Guidelines recommend, and more importantly young people want, access to psycho-social interventions as well as medication. However, available evidence suggests poor

quality transitional care and adult services that are highly focused on medication.Adult ADHD services need to undergo similar development to that experienced by Child and Adolescent Mental Health Services and community paediatrics over the last few decades. While we debate the relative merits of dedicated or specialist v. generic adult mental health services, for young adults with ADHD the training, experience and availability of professionals are more important than their qualifications or setting

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Eur Child Adolesc Psychiatry. 2019 Nov;28:1537-46.

THE VALIDITY OF CONDUCT DISORDER SYMPTOM PROFILES IN HIGH-RISK MALE YOUTH.

Aebi M, Barra S, Bessler C, et al.

Conduct disorder (CD) is a heterogeneous pattern of rule-breaking and aggressive symptoms. Until now it has been unclear whether valid, clinically useful symptom profiles can be defined for populations in youth at high-risk of CD. Interview-based psychiatric disorders, CD symptoms and officially recorded offences were assessed in boys from a detention facility and a forensic psychiatric hospital (N = 281; age 11.2-21.3 years). We used latent class analyses (LCA) to examine CD subtypes and their relationships with comorbid psychiatric disorders, suicidality, and criminal recidivism. LCA revealed five CD subtypes: no CD, mild aggressive CD, mild covert CD, moderate CD, and severe CD. The severe and, to a lesser degree, the moderate CD subtype were related to comorbid attention deficit hyperactivity disorder, substance use disorder, affective disorder, and suicidality. Time to violent criminal re-offending was predicted by severe CD (OR 5.98, CI 2.5-13.80) and moderate CD (OR 4.18, CI 1.89-9.21), but not by any other CD subtype in multivariate Cox regressions (controlling for age, low socioeconomic status and foreign nationality). These results confirm the existence of different CD symptom profiles in a high-risk group. Additional variable-oriented analyses with CD symptom count and aggressive/rule-breaking CD-dimensions further supported a dimensional view and a dose-response relationship of CD and criminal recidivism. Classifying high-risk young people according to the number of aggressive and rule-breaking CD symptoms is of major clinical importance and may provide information about risk of violent recidivism

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Eur Child Adolesc Psychiatry. 2019 Nov;28:1499-506.

MATERNAL PRE-PREGNANCY WEIGHT STATUS AND HEALTH CARE USE FOR MENTAL HEALTH CONDITIONS IN THE OFFSPRING.

Grudzinski A, Campbell LA, Liu L, et al.

The objective of this study was to examine the relationship between pre-pregnancy maternal weight status and offspring physician visits for mental health conditions in childhood and adolescence. We conducted a population-based retrospective cohort study of singleton infants born between the years of 1989 and 1993 using a linkage of the Nova Scotia Atlee Perinatal Database with administrative health data. Offspring were followed from birth to age 18 years. Maternal weight status was categorized according to WHO body mass index cutoffs. The number of physician visits for any mental health condition, mood, anxiety, and adjustment disorders, conduct disorder, and attention-deficit hyperactivity disorder (ADHD) from age 0-18 years was determined from ICD codes in physician billings and hospital discharge abstract data. Negative binomial regression adjusting for sociodemographics, maternal psychiatric disorders and smoking was used to model the association. In total, 38,211 mother-offspring pairs were included in the cohort. Within the first 18 years of life, offspring of mothers with obesity had significantly more physician visits for any mental health condition [adjusted incidence rate ratio (IRR) 1.26, 95% CI 1.19-1.34], mood, anxiety, and adjustment disorders (IRR 1.16, 95% CI 1.07-1.25), conduct disorder (IRR 1.25, 95% CI 1.08-1.45), and ADHD (IRR 1.45, 95% CI 1.24-1.69) compared to mothers of normal weight. Associations for mood, anxiety, and adjustment disorders and conduct disorder were strongest at 13-18 years. Offspring of mothers with obesity appear to use health care for mental health conditions more frequently than offspring of normal weight mothers

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Eur J Pediatr. 2019 Aug;178:1129-37.

THE ROLE OF SLEEP-RELATED COGNITIVE FUNCTIONS IN THE SPECTRUM OF BENIGN EPILEPSY WITH CENTRO-TEMPORAL SPIKES.

Miano S, Datta AN.

Heterogeneous cognitive deficits have been described in the spectrum of benign epilepsy with centro-temporal spikes, which strongly correlate with the intensity of interictal epileptiform discharges and its spreading, in particular during sleep, mostly within the perisylvian cognitive network. The aim of this review is to discuss current findings regarding the connection between sleep alterations and cognitive function in the spectrum of benign epilepsy with centro-temporal spikes. A longer sleep onset latency is the only evident sleep macrostructure alteration reported in the spectrum of benign epilepsy with centro-temporal spikes. On a microstructural level, a higher spike count of descending compared to ascending slopes of sleep cycles, an impairment of slow wave downscaling, and amplitude and slope of slow waves were found in the spectrum of benign epilepsy with centro-temporal spikes. Moreover, children with benign epilepsy with centro-temporal spikes had a reduced non-rapid eye movement sleep instability, in terms of cyclic alternating pattern, similar to that found in children with attention-deficit hyperactivity disorders and in children with obstructive sleep apnea and centro-temporal spike during sleep. Children with benign epilepsy with centro-temporal spikes have a known comorbidity with attention-deficit hyperactivity disorders and obstructive sleep apnea.Conclusion: Considering the common sleep microstructure alterations, the presence of attention deficit and hyperactivity and/or sleep apnea may be a considered warning sign in the case of benign epilepsy with centro-temporal spikes. What is Known: * Sleep related-cognitive deficits have been described in the spectrum of benign epilepsy with centro-temporal spikes. The degree of sleep alterations may predict the neurocognitive outcome, and help clinicians to choose the right treatment. What is New: * Considering the common sleep microstructure alterations, attention deficit and sleep apnea, may be a considered warning signs

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Eur Child Adolesc Psychiatry. 2019.

MATERNAL PERSONALITY TRAITS MODERATE TREATMENT RESPONSE IN THE MULTIMODAL TREATMENT STUDY OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Perez AG, MacPherson HA, Arnold LE, et al.

Some mothers of children with attention-deficit/hyperactivity disorder (ADHD) present with maladaptive personality profiles (high neuroticism, low conscientiousness). The moderating effect of maternal personality traits on treatment outcomes for childhood ADHD has not been examined. We evaluate whether maternal neuroticism and conscientiousness moderated response in the Multimodal Treatment Study of Children with ADHD. This is one of the first studies of this type. In a randomized controlled trial (RCT), 579 children aged 7ΓÇô10 (M = 8.5); 19.7% female; 60.8% White with combined-type ADHD were randomly assigned to systematic medication management (MedMgt) alone, comprehensive multicomponent behavioral treatment (Beh), their combination (Comb), or community comparison treatment-as-usual (CC). Latent class analysis and linear mixed effects models included 437 children whose biological mothers completed the NEO Five-Factor Inventory at baseline. A 3-class solution demonstrated best fit for the NEO: MN&MC = moderate neuroticism and conscientiousness (n = 284); HN&LC = high neuroticism, low conscientiousness (n = 83); LN&HC = low neuroticism, high conscientiousness (n = 70). Per parent-reported symptoms, children of mothers with HN&LC, but not LN&HC, had a significantly better response to Beh than to CC; children of mothers with MN&MC and LN&HC, but not HN&LC, responded better to Comb&MedMgt than to Beh&CC. Per teacher-reported symptoms, children of mothers with HN&LC, but not LN&HC, responded significantly better to Comb than to MedMgt. Children of mothers with high neuroticism and low conscientiousness benefited more from behavioral treatments (Beh vs. CC; Comb vs. MedMgt) than other children. Evaluation of maternal personality may aid in treatment selection for children with ADHD, though additional research on this topic is needed

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Eur Child Adolesc Psychiatry. 2020.

AUTISM SPECTRUM DISORDER AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN CHILDREN WITH CEREBRAL PALSY: RESULTS FROM SCREENING IN A POPULATION-BASED GROUP.

Pahlman M, Gillberg C, Wentz E, et al.

Autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD) are more common in children with cerebral palsy (CP) than in the general population, but may still be underdiagnosed. This study aimed to estimate screen-positive ASD and ADHD in a population-based group of 264 school-aged children with CP born 1999ΓÇô2006 from the CP register of western Sweden. Validated parent-completed questionnaires were used at a median age of 12-áyears 11-ámonths (range 8ΓÇô17-áyears). Three different scales were used to detect signs of ASD and ADHD, respectively. Response rate was 88% (232/264). In 19 children, all in the most disabled group, the screening procedure was not feasible due to too few questionnaire items completed, leaving 213 for analyses. One third (74/213) of the children screened positive for ASD and half of the children (106/213) for ADHD, which was about twice as often as ASD/ADHD diagnoses had been clinically identified. Children with intellectual disability, epilepsy and/or impaired speech ability more often screened positive for ASD as well as ADHD. Severe motor impairment was more frequently associated with screen-positive ASD, but not-áADHD. Neither sex nor CP type was associated with screen-positive ASD/ADHD. In conclusion, school-aged children with CP very often screened positive for ASD and/or ADHD. The prevalence of ASD and ADHD is most likely underestimated in children with CP. These screening findings require further investigations

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Eur Child Adolesc Psychiatry. 2020.

WHAT EXPLAINS THE LINK BETWEEN CHILDHOOD ADHD AND ADOLESCENT DEPRESSION? INVESTIGATING THE ROLE OF PEER RELATIONSHIPS AND ACADEMIC ATTAINMENT.

Powell V, Riglin L, Hammerton G, et al.

There is increasing evidence that childhood Attention-Deficit Hyperactivity Disorder (ADHD) elevates risk of later depression, but the mechanisms behind this association are unclear. We investigated the relationship between childhood ADHD symptoms and late-adolescent depressive symptoms in a population cohort, and examined whether academic attainment and peer problems mediated this association. ALSPAC (Avon Longitudinal Study of Parents and Children) is an ongoing prospective longitudinal population-based UK cohort that has collected data since September 1990. 2950 individuals with data on parent-reported ADHD symptoms in childhood (7.5-áyears) and self-reported depressive symptoms in late adolescence (17.5-áyears) were included in analyses. 2161 individuals with additional data at age 16-áyears on parent-reported peer problems as an indicator of peer relationships and formal examination results (General Certificate of Secondary Education; GCSE) as an indicator of academic attainment were included in mediation analyses. Childhood ADHD symptoms were associated with higher depressive symptoms (b = 0.49, SE = 0.11, p < 0.001) and an increased odds of clinically significant depressive symptoms in adolescence (OR = 1.27, 95% CI 1.15ΓÇô1.41, p < 0.001). The association with depressive symptoms was mediated in part by peer problems and academic attainment which accounted for 14.68% and 20.13% of the total effect, respectively. Childhood ADHD is associated with increased risk of later depression. The relationship is mediated in part by peer relationships and academic attainment. This highlights peer relationships and academic attainment as potential targets of depression prevention and intervention in those with ADHD. Future research should investigate which aspects of peer relationships are important in conferring later risk for depression

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Eur J Neurosci. 2019.

INCREASED MIRROR OVERFLOW MOVEMENTS IN ADHD ARE ASSOCIATED WITH ALTERED EEG ALPHA/BETA BAND DESYNCHRONIZATION.

McAuliffe D, Hirabayashi K, Adamek JH, et al.

Children with ADHD show developmentally abnormal levels of mirror overflow unintentional movements occurring symmetrically opposite of intentional movements. Because mirror overflow correlates with ADHD

behavioral symptoms, the study of disinhibition in motor control may shed light on physiologic mechanisms underlying impaired behavioral/cognitive control. This is a case controlled study of EEG recording from 25 children with ADHD and 25 typically developing (TD) controls performing unilateral sequential finger tapping, with overflow movements measured using electronic goniometers. Consistent with previously published findings, children with ADHD showed increased mirror overflow as compared with TD peers. EEG findings revealed less lateralized alpha modulation (event-related desynchronization; ERD) and decreased magnitude of beta ERD in ADHD; both alpha and beta ERD reflect cortical activation. Moderation analysis revealed a significant association between beta ERD and overflow, independent of diagnosis; and an equivocal (p-á=.08) effect of diagnosis on the relationship between alpha ERD and overflow, with a significant effect in children with ADHD but not TD children. These results suggest two mechanisms involved with mirror overflow: one reflected in beta ipsilateral to the intentional movement and relevant to both children with ADHD and controls, and the other seemingly more specific to ADHD (alpha, contralateral to movement)

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Europ J Spec Needs Educ. 2019.

INCLUSION IN COMMUNITY SERVICES AND PTSD SYMPTOMS AMONG ADOLESCENTS WITH ATTENTION-DEFICIT DISORDERS (ADHD) AND LEARNING DISABILITIES (LD).

Margalit M, Abramowitz MZ, Jaffe E, et al.

The inclusion challenge of students with special educational needs does not end in the classroom. Mandatory community services in Israel may present unique challenges and supportive demands from their teachers. The goals of this study were to examine the risks experienced by youth with ADHD who joined rescue workers such as ambulance teams. The predicting role of ADHD as risk factors for developing Posttraumatic Stress Disorder (PTSD) symptoms was investigated as well as the mediating factors of learning difficulties, self-efficacy and social support. The study consisted of 451 high-school students (ages 16ΓÇô18) who joined ambulance teams as part of their mandatory high-school community services. Their levels of PTSD symptoms, ADHD, LD, Self-efficacy and social support were examined. Following preliminary analysis, a serial mediation model was examined. Initially, the predicting effect of ADHD symptoms on the PTSD symptoms was significant. However, the model demonstrated that the LD, self-efficacy and social support fully mediated the relationship between ADHD and PTSD symptoms. The inclusion of students in these community services requests awareness to risks and their needs. ADHD and LD symptoms may present additional risk factors. But self-efficacy and social support can reduce this risk, emphasising the importance of school climate, teachersΓÇÖ training and educational planning to promote successful inclusion

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Eur Neuropsychopharmacol. 2020 Jan;30:102-13.

ROLE OF CONDUCT PROBLEMS IN THE RELATION BETWEEN ATTENTION-DEFICIT HYPERACTIVITY DISORDER, SUBSTANCE USE, AND GAMING.

Schoenmacker GH, Groenman AP, Sokolova E, et al.

Known comorbidities for Attention-Deficit Hyperactivity Disorder (ADHD) include conduct problems, substance use disorder and gaming. Comorbidity with conduct problems may increase the risk for substance use disorder and gaming in individuals with ADHD. The aim of the study was to build a causal model of the relationships between ADHD and comorbid conduct problems, and alcohol, nicotine, and other substance use, and gaming habits, while accounting for age and sex. We used a state-of-the-art causal discovery algorithm to analyze a case-only sample of 362 ADHD-diagnosed individuals in the ages 12–24 years. We found that conduct problem severity mediates between ADHD severity and nicotine use, but not with more severe alcohol or substance use. More severe ADHD-inattentive symptoms lead to more severe gaming habits. Furthermore, our model suggests that ADHD severity has no influence on severity of alcohol or other drug use. Our findings suggest that ADHD severity is a risk factor for nicotine use, and that this effect is fully mediated by conduct problem severity. Finally, ADHD-inattentive severity was a risk factor for gaming, suggesting that gaming dependence has a different causal pathway than substance dependence and should

be treated differently. By identifying these intervention points, our model can aid both researchers and clinicians

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Expert Opin Pharmacother. 2020.

EVALUATION OF THE CURRENT DATA ON GUANFACINE EXTENDED RELEASE FOR THE TREATMENT OF ADHD IN CHILDREN AND ADOLESCENTS.

Childress A, Hoo-Cardiel A, Lang P.

Introduction: Attention-deficit/hyperactivity disorder (ADHD) commonly occurs in children, adolescents, and adults. Although symptoms of ADHD often respond robustly to treatment with stimulants (amphetamine or methylphenidate), not all patients are appropriate candidates for treatment with these drugs. Guanfacine extended-release (GXR) is a non-stimulant alternative drug approved for the treatment of ADHD in the United States (U.S.), Canada, and Europe.

Areas covered: The chemistry, pharmacokinetics, mechanism of action and dosage of GXR are presented. Efficacy and safety data obtained in clinical trials with subjects aged 6-17 years for both GXR monotherapy and use in combination with stimulants are described. Meta-analyses comparing GXR to other drugs are presented. MedWatch surveillance data collected for GXR since approval in the U.S. are also discussed.

Expert opinion: Although GXR is effective for the treatment of ADHD and has a different side effect profile than stimulants, it is not as impressive in reducing symptoms. Despite the availability of multiple pharmacological treatments for ADHD, there remains an unmet need for formulations as potent as stimulants but with fewer adverse effects. Several pharmacological agents for ADHD treatment are in development. It is not clear that any of these compounds will replace currently available formulations as first-line alternatives

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Folia Phoniatr Logop. 2019;71:146-55.

NEURAL UNDERPINNINGS OF EARLY SPEECH PERCEPTION AND EMERGENT LITERACY.

Lee CY.

Mismatch negativity (MMN) is an event-related potential component used to index automatic auditory change detection. Thus, MMN provides an excellent tool to assess the speech sensitivity of infants and children. Although MMN is well established in adults, the polarity and latency of mismatch responses (MMRs) in infants are highly inconsistent across studies. This paper aims to provide a comprehensive review of MMN studies of speech perception in early infancy. In particular, data from a series of MMN studies of Mandarin lexical tone, vowels, and initial consonants will be presented to demonstrate how phonological saliency, size of deviance, and neural maturation modulate MMRs in early infancy. These data suggest that MMN and positive MMRs index different functional characteristics and may provide information on when and how children's speech perception becomes automatic at different developmental stages. By using MMN to index sensitivity to speech discrimination, dyslexic children usually show reduced or absent MMN, which supports the relationship between phonological sensitivity and literacy. However, children with attention deficit/hyperactivity disorder showed the typical MMN, but attenuated P3a and enhanced late discriminative negativity. Taken together, the MMR characteristics, including amplitude, peak latency, and the transition of polarity, may be used to index the maturation of speech development and for the early identification of children with atypical language development

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Front Human Neurosci. 2019;13.

GENDER DIFFERENCES IN OBJECTIVE AND SUBJECTIVE MEASURES OF ADHD AMONG CLINIC-REFERRED CHILDREN.

Slobodin O, Davidovitch M.

Attention deficit hyperactivity disorder (ADHD), one of the most prevalent childhood disorders today, is generally more likely to be diagnosed and treated in boys than in girls. However, gender differences in ADHD

are currently poorly understood, partly because previous research included only a limited proportion of girls and relied mainly on subjective measures of ADHD, which are highly vulnerable to reporterΓÇÖs bias. To further examine gender differences in ADHD and to address some of the shortcomings of previous studies, this study examined gender differences in subjective and objective measures of ADHD among clinic-referred children with ADHD. Participants were 204 children aged 6ΓÇô17 years-old with ADHD (129 boys, 75 girls). A retrospective analysis was conducted using records of a clinical database. Obtained data included parent and teacher forms of the Conners ADHD rating scales, Child Behavior Checklist (CBCL), TeacherΓÇÖs Report Form (TRF), and childΓÇÖs continuous performance test (CPT) scores. Results showed that according to parentsΓÇÖ and teachersΓ ÇÖ reports of ADHD-related symptoms (Conners ADHD rating scales), girls had more inattention problems than boys, but no differences were identified in the level of hyperactivity and impulsivity symptoms. CPT data, however, revealed higher impulsivity among boys. We did not find gender differences in the level of distractibility during CPT performance. Specifically, the effects of distractors type (visual environmental stimuli, auditory stimuli, or a combination of them) and distractors load (one or two distracting stimuli at a time) on CPT performance did not differ between boys and girls with ADHD. These findings suggest that gender effects on ADHD symptoms may differ between subjective and objective measures. Understanding gender differences in ADHD may lead to improved identification of girls with the disorder, helping to reduce the gender gap in diagnosis and treatment

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Health Serv Res. 2019 Oct;54:1007-15.

HOW DOES BEING PART OF A PEDIATRIC ACCOUNTABLE CARE ORGANIZATION IMPACT HEALTH SERVICE USE FOR CHILDREN WITH DISABILITIES?

Song PH, Xu WY, Chisolm DJ, et al.

OBJECTIVE: To examine the impact of a Medicaid-serving pediatric accountable care organization (ACO) on health service use by children who qualify for Medicaid by virtue of a disability under the "aged, blind, and disabled" (ABD) eligibility criteria.

DATA SOURCES/STUDY SETTING: We evaluated a 2013 Ohio policy change that effectively moved ABD Medicaid children into an ACO model of care using Ohio Medicaid administrative claims data for years 2011-2016. STUDY DESIGN: We used a difference-in-difference design to examine changes in patterns of health care service use by ABD-enrolled children before and after enrolling in an ACO compared with ABD-enrolled children enrolled in non-ACO managed care plans.

DATA COLLECTION/EXTRACTION METHODS: We identified 17 356 children who resided in 34 of 88 counties as the ACO "intervention" group and 47 026 ABD-enrolled children who resided outside of the ACO region as non-ACO controls.

PRINCIPAL FINDINGS: Being part of the ACO increased adolescent preventative service and decreased use of ADHD medications as compared to similar children in non-ACO capitated managed care plans. Relative home health service use decreased for children in the ACO.

CONCLUSIONS: Our overall results indicate that being part of an ACO may improve quality in certain areas, such as adolescent well-child visits, though there may be room for improvement in other areas considered important by patients and their families such as home health service

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Horm Res Paediatr. 2018;90:135-36.

ASSOCIATIONS BETWEEN MATERNAL AND OFFSPRING HAIR CORTISOL CONCENTRATIONS AND CHILD BEHAVIORAL SYMPTOMS IN PAIRS OF CHILDREN 18-48 MONTHS OLD AND THEIR MOTHERS WITH AND WITHOUT PERINATAL MENTAL DISORDERS.

Agapaki A, Papagianni F, Valavani E, et al.

Introduction: Maternal perinatal mental disorders (PMDs) are associated with developmental and behavioral problems in the offspring, probably mediated by the programming of the limbic-hypothalamic-pituitary-adrenal (LHPA) axis. Increased or decreased cortisol concentrations during pregnancy and the perinatal

period have been associated with alterations in the stress responses of the offspring and with child behavioral problems; however, such associations remain unclear.
Methods: We compared 16 mothers with PMDs and their children (18-48 months) with 30 aged-matched control mothers and their children (92 individuals in total). Participants of both groups were evaluated with a clinical interview, the Depression Anxiety Stress Scale (DASS-42) and the Child Behavior Checklist 11/2-5 (CBCL 11/2-5) questionnaires. We measured mother and child hair cortisol concentrations, which is a reliable biomarker of chronic stress exposure.
Results: Children of the PMD group had increased symptoms of attention deficit hyperactivity disorder (p=0.035) compared to the control group. The PMD mothers had lower hair cortisol concentrations (11,8 -¦ 8,2mg/dl) than the control mothers (13.9 -¦ 9 mg/dl), however, the difference was not statistically significant (p=0,471). Similarly, children of the PMD group had lower hair cortisol concentrations (12 -¦ 9,7mg/dl) than the controls (15.9 -¦ 17.4 mg/dl), but this difference was not significant (p=0.455). A positive linear association between maternal and child hair cortisol concentrations was found in the total sample of mother-child pairs (r=0,63, p<0.001), as well as in the control group separately (r=0,63, p<0.001). This association, however, was not significant in the PMD group (r=0,57, p=0.05). In the PMD group, child ?anxiety / depression symptoms were associated with child hair cortisol concentrations (r=0.57, p=0.042). In the same group (PMDs) symptoms of aggressive behavior and oppositional/defiant problems of children were significantly associated with both their hair cortisol concentrations (r=0.67, p=0.013; r=0.58, p=0.037) and with their mothers' hair cortisol concentrations (r=0.61, p=0.028; r=0.58, p=0.039, respectively).
Conclusions: These findings suggest that a chronic dysregulation of maternal and child HPA axis in the PMD pairs may underlie the associations between chronic maternal stress and child behavioral and emotional problems and stress responses

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Horm Res Paediatr. 2018;90:147-48.

THE EFFECTIVENESS OF A STRESS-MANAGEMENT INTERVENTION PROGRAM IN BEHAVIORAL PARAMETERS AND HAIR CORTISOL CONCENTRATIONS IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Kapogiannis A, Makris G, Mantzou A, et al.

Background: Attention-deficit/hyperactivity disorder (ADHD) is the most common neurodevelopmental condition in school-aged children, with a prevalence of 5-8%. In individuals with ADHD, there is an attenuated biologic stress response to challenging situations.
Objective: This study aimed at evaluating the effectiveness of an 8-week stress management program, comprising self-applied cognitive exercises, on stress perception and anxiety symptoms, sleep quality and hair cortisol concentrations in children with ADHD.
Method: Sixty children (65% males) with ADHD, aged between 7 and 12 years old, and their parents took part in the study. All children were under usual behavioral therapy care, but no pharmacotherapy. The intervention was an 8-week, two-armed, non-blinded, randomized, controlled trial with a 1:1 allocation ratio, intervention vs. wait-list, control groups. The Achenbach system (CBCL questionnaires), the ADHD scales (DuPaul et al.), the Personal Control Questionnaire, and the Pittsburg Sleep Questionnaire were completed by parents at baseline and after the intervention in both groups. Hair cortisol concentrations were measured in both groups at the two time-points (i.e. before and after the intervention).
Results: Statistically significant decreases before and after the intervention were found in the subscales of the DuPaul questionnaire scores (inattention, hyperactivity-impulsivity and total, p<0.001 for all three scales) only within the stress-management intervention group. Similarly, the intervention group showed decreases before and after the intervention in most scales of the CBCL questionnaire (academic performance and learning, p<0.001; internalizing problems p=0.001; thought problems p=0.006; externalizing problems p=0.001; affective problems p-0.001; anxiety problems p=0.02; ADHD problems p<0.001; oppositional-defiant problems p=0.001; conduct problems p=0.001; sluggish-cognitive tempo p<0.001; obsessive-compulsive problems p=0.001; PTSD problems p<0.001). Improvement was shown in the Pittsburg Sleep Quality questionnaire scores, after the intervention (p=0.003). Although an increase trend was noted after the intervention, no statistically significant differences in hair cortisol concentrations were found between or within groups (p= 0.309 & p=0.061, respectively).

Conclusion: The intervention group exhibited ameliorated ADHD symptomatology, decreased anxiety, and better sleep quality, as well as reduced internalizing and externalizing problems after the implementation of the stress management program. The lack of a statistically significant difference in the hair cortisol concentrations after the 8-week intervention period, may be attributed to the short time interval between the two assessments. We conclude that a stress management program as a supportive intervention to behavioral therapy, may be beneficial in children with ADHD

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Horm Res Paediatr. 2019;91:347.

HEIGHT CURVES AND HEIGHT SDS IN ADHD CHILDREN MEASURED BEFORE AND AFTER STIMULANT TREATMENT ARE NOT AFFECTED-OBSERVATION STUDY IN 7172 ADHD CHILDREN.

Carmi D, Gabbay U, Mimouni-Bloch A, et al.

Background: Attention deficit hyperactivity disorder (ADHD) is a common pediatric disorder with ongoing debate in the literature about its association with growth impairment. Most studies have focused on stimulants treatment effect while others suggested direct effect of ADHD. The present study compared height growth of ADHD children each measured before and after stimulant treatment.

Methods: We conducted historical prospective study based on Israeli largest health services provider (Clalit Health Services, 55% of the total population) database. Inclusion criteria were ADHD children 5-18 years old before treatment that eventually received stimulant medications consumed at least for 2 months and accordingly had documented anthropometrics before and after stimulant treatment. A non-ADHD control group derived from the general population of the same birth cohort ages 5-18 was also retrieved as the basis for local Standard Deviation Score (SDS) calculations. Exclusion criteria were documented co-morbidities in either group. We compared gender specific median height curve of the three groups (ADHD before and after treatment and non-ADHD control). We calculated ADHD heights SDS using the control sample statistics (gender and age specific) and analyzed individual's height SDS difference before and after treatment by t-test.

Results: there were 7172 ADHD and 16240 non-ADHD controls. The height curves were nearly overlapping. There was neither difference between gender specific median height curve of ADHD before treatment, non-ADHD control and ADHD after treatment (in both genders). Analysis of the individual's height SDS differences based on the control sample statistics revealed mean height SDS for HDHD males before treatment of 0.027 and height SDS of-0.046 after treatment, and mean height SDS for HDHD females before treatment of 0.086 and height SDS of 0.030 after treatment.

Discussion and conclusions: The study results support evidence that neither ADHD nor ADHD stimulants treatment nor their combined effect have significant effect on linear growth

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Horm Res Paediatr. 2019;91:106.

CHILDREN AND ADOLESCENTS IN THE UNITED STATES WITH CONGENITAL ADRENAL HYPERPLASIA ARE NOT AT INCREASED RISK FOR ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Harasymiw L, Grosse S, Sarafoglou K.

Background: Congenital adrenal hyperplasia (CAH) is a rare form of adrenal insufficiency characterized by impaired cortisol synthesis leading to excessive adrenal androgen production. Little is known regarding the effects of early and chronic androgen exposure in children with CAH, and whether this exposure may increase the risk of developing attention-deficit/hyperactivity disorder (ADHD) during childhood. The only study on the subject, based on a small sample of children and adolescents with CAH (n=54), reported an increased rate of ADHD. The objective of the current study was to investigate the prevalence of ADHD in large administrative samples of insured children and adolescents with CAH compared to the general pediatric population in the United States.

Methods: We used the Treatment Pathways® interface to analyze data for individuals enrolled in employer-sponsored or public insurance plans with inclusion of pharmacy and mental health services claims in the IBM® MarketScan® Commercial and Medicaid Claims Databases. Subjects were included if they were

continuously enrolled for ≥12 months from the first outpatient claim during October 2015-December 2017 and were between the ages of 5 and 18 years at that time. CAH prevalence was measured as the percentage of children and adolescents with ≥2 claims with E25.0 ICD-10 codes for CAH and ≥2 glucocorticoid prescriptions filled during the study period. ADHD prevalence was ascertained using a published claims-based algorithm. Subjects were stratified by age (5-11 years vs 12-18 years).
Results: The study period prevalence of CAH in the Commercial (N=3,532,914) and Medicaid (N=2,766,297) samples was 1/9,500 (n=373) and 1/14,000 (n=201), respectively. The prevalence of ADHD in the general population was 7.7% in the Commercial sample and 15.1% in the Medicaid sample. Among children and adolescents with CAH, there was no increase in risk of ADHD in either the Commercial (7.8% (n=29), odds ratio (OR)=1.01, 95% confidence interval (CI): 0.68-1.45, P=0.95) or Medicaid (13.9% (n=28), OR=0.91, 95% CI: 0.60-1.34, P=0.65) samples, as compared to the general population. ADHD prevalence did not differ significantly by age among those with CAH in either the Commercial or Medicaid samples.
Conclusions: Using two large national samples of privately and publicly insured children and adolescents with CAH in the United States, we found that the prevalence of medically-managed ADHD was comparable to that of the general pediatric population. These findings suggest that enhanced screening for ADHD among the pediatric CAH population may not be warranted

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Horm Res Paediatr. 2019;91:88-89.
DUAL DIAGNOSIS OF TYPE 1 DIABETES AND ADHD.
Mazor-Aronovitch K, Pinhas-Hamiel O, Modan-Moses D, et al.
Background: Attention-deficit/hyperactivity disorder (ADHD) is the most common neurobehavioral disorder of childhood. Type 1 diabetes (T1DM) is the most common metabolic disease in children. The treatment of T1DM requires high executive functions and requires very intensive treatment that could be an obstacle for patients with ADHD. Dual diagnosis of T1DM and ADHD might affect treatment, control and complications of T1DM. In order to prevent long-term complications we should target glycaemic control to HbA1c lower than 7% as well as low glucose variability. The aims of this study were to compare the following parameters between children with T1DM with or without ADHD: HbA1c, episodes of severe hypoglycaemia, diabetes ketoacidosis (DKA), quality of life (QOL), time in range and glucose variability parameters.
Methods: T1DM patients aged 6-18 years were recruited from 3 paediatric diabetes clinics. ADHD screening questionnaire was given to parents of T1DM patients without ADHD diagnosis. Patients with suspected ADHD were excluded from the study. All parents filled a Diabetes QOL questionnaire. Glycaemic data was downloaded from glucometers, pumps and CGMs. Other data, including HbA1c, hospitalisation, severe hypoglycaemia and DKA events were retrieved from the medical files.
Results: The study cohort comprised 111 patients with T1DM: 27 were diagnosed with ADHD (24%) and 84 without ADHD (Control group). Mean-¦SD age of the ADHD group and Control group was 14.6-¦2.8 and 12.6-¦3.3 years, respectively (p=0.006). Mean HbA1c was significantly higher in the ADHD group, 8.5-¦1.2 % vs. 7.8-¦1.0 % (p=0.003). There was no difference in QOL and in severe hypoglycaemia or DKA events between the groups. Sixtytwo patients used CGM, 13 (21%) with ADHD. Time in range (TIR) (70-180 mg/dl) was significantly lower in the ADHD group, 49-¦17% vs. 59-¦15% (p=0.05). In a regression model for age the following parameters retrieved from CGMs were significantly higher in the ADHD group vs. the Control group: mean glucose (p=0.024), SD of glucose (p=0.028), TIR (p=0.015), percentage time above 180 mg/dl (p=0.025), percentage time above 240 mg/dl (p=0.015), and in glucose variability parameters: ADRR (p=0.016), HBGI (p=0.009), MAGE (p=0.042). There were no differences in percentage time below 70 mg/dl and below 55mg/dl.
Discussion: Coexistence of T1DM and ADHD during childhood leads to significantly higher HbA1c, TIR and glucose variability parameters compared to patients without ADHD. Healthcare providers should be aware of the difficulties of patients with T1DM and ADHD to get organised and to cope with the current intensive treatment of diabetes

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Indian Pediatr. 2019;56:1025-28.

CHILDREN'S COLOR TRAIL TEST FOR OBJECTIVE ASSESSMENT OF ATTENTION IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER: A DIAGNOSTIC ACCURACY STUDY.

Juneja M, Mehar H, Sairam S, et al.

Objective: To compare the ChildrenΓÇÖs Color Trail Test scores in children with and without Attention Deficit Hyperactivity Disorder to assess its diagnostic performance in assessing attention-deficit.

Methods: 50 children with Attention Deficit Hyperactivity Disorder (diagnosed as per Diagnostic and Statistical Manual, 5th edition) and 50 age- and sex-matched children underwent Test 1 and Test 2 of the Children's Color Trail Test. A Receiver Operating Characteristics curve was constructed for the diagnostic accuracy of Children's Color Trail Test in Attention Deficit Hyperactivity Disorder.

Results: The Receiver Operating Characteristics curve showed a score 32 for Children's Color Trail Test 1 [AUC: 0.8 (0.71 to 0.87); P<0.001] and score 40 for Children's Color Trail Test 2 [AUC: 0.85 (0.77 to 0.92); P<0.001] as the best cut-off for diagnosing Attention Deficit Hyperactivity Disorder.

Conclusion: Children's Color Trail Test is a promising tool for diagnosing attention deficit, and could be used in settings where parent or teacher reports are not available

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Inhalation Toxicology. 2019;31:420-27.

SECONDHAND SMOKE AS A RISK FACTOR FOR ATTENTION DEFICIT HYPERACTIVITY DISORDER IN CHILDREN.

Abdel Hamed NA, Hammad EED, Salama RH, et al.

Background: Attention deficit hyperactivity disorder (ADHD) is recognized as a common childhood psychiatric disorder with a worldwide prevalence estimated at 5%. In Egypt, early exposure of children to smoke occurred due to many causes mainly tobacco use. This exposure is linked to a variety of developmental and behavioral consequences for children. This study aimed to investigate the potential association between secondhand smoke (SHS) exposure and ADHD in children and find the association between the level of exposure to SHS and the degree of ADHD symptoms.

Method: Case-control study was done by a random selection of children from the outpatient Clinic of Assiut University Hospital of Children. Data were collected by a questionnaire to evaluate home exposure to SHS and blood sampling for serum cotinine measurement as an indicator of exposure to SHS.

Results: Of 70 ADHD children, 62 (88.6%) of them reported home exposure to smoke while only 14 of 30 control children (46.7%) reported home exposure to smoke. The serum cotinine level was insignificantly higher in the ADHD group than the control group.

Conclusion: In conclusion, there is a significant association between ADHD in the examined sample of children and exposure to SHS. Serum cotinine is a biomarker reflecting current exposure to SHS but it is not a reliable indicator of past and long-term exposure to SHS

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Int Clin Psychopharmacol. 2019 May;34:138-42.

HIGH PRETREATMENT COGNITIVE IMPULSIVITY PREDICTS RESPONSE OF OPPOSITIONAL SYMPTOMS TO METHYLPHENIDATE IN PATIENTS WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER/OPPOSITIONAL DEFIANT DISORDER.

Golubchik P, Shalev L, Tsamir D, et al.

The aim of this study was to compare impulsivity levels, as assessed by a continuous performance test (CPT), and the correlations between baseline CPT performance and response to methylphenidate (MPH), as assessed by the conjunctive CPT (CCPT), in children with only Diagnostic and Statistical Manual of Mental Disorders, 5th ed. attention-deficit hyperactivity disorder with no oppositional defiant disorder (ADHD/noODD) or with comorbid ODD (ADHD/ODD). Fifty-three children and adolescents were included in the study (ADHD/noODD group, n = 25, 12 women/13 men and ADHD/ODD group, n = 28, eight females/20 males). Attention was assessed at baseline using CCPT. ADHD and ODD severities were assessed at baseline and following a 12-week MPH treatment using the ADHD-rating scale (ADHD-RS) completed by the parent and by a teacher and the Kiddie-Schedule for Affective Disorders and Schizophrenia for School-Age

Children-ODD (K-SADS-ODD) completed by the treating psychiatrist. Higher baseline commission-errors rates (P = 0.0031) in ADHD-RS/parent-child, ADHD-RS/teacher, and K-SADS-ODD scores were detected in ADHD/ODD compared with the ADHD/noODD. Significant improvements in ADHD-RS/parent-child, ADHD-RS/teacher, and K-SADS-ODD scores were achieved following MPH treatment in both groups. Significant correlations were found between baseline CCPT commission-error rates and improvement in ADHD-RS-teacher in ADHD/noODD, but not in ADHD/ODD. Among the ADHD/ODD, but not the ADHD/noODD, a significant correlation was found between baseline CCPT commission-error rates and improvement in K-SADS-ODD. Baseline cognitive impulsivity (as measured by the CCPT) can predict response of ODD to MPH treatment in ADHD/ODD patients

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Int J Circumpolar Health. 2019 Dec;78:1571382.

PSYCHIATRIC RESEARCH IN THE NORTHERN FINLAND BIRTH COHORT 1.

Miettunen J, Haapea M, Bjornholm L, et al.

The Northern Finland Birth Cohort 1986 is a large population-based birth cohort, which aims to promote health and wellbeing of the population. In this paper, we systematically review the psychiatric research performed in the cohort until today, i.e. at the age of 32 years of the cohort (2018). We conducted a systematic literature search using the databases of PubMed and Scopus and complemented it with a manual search. We found a total of 94 articles, which were classified as examining ADHD, emotional and behavioural problems, psychosis risk or other studies relating to psychiatric subjects. The articles are mainly based on two large comprehensive follow-up studies of the cohort and several substudies. The studies have often used also nationwide register data. The studies have found several early predictors for the aforementioned psychiatric outcomes, such as problems at pregnancy and birth, family factors in childhood, physical inactivity and substance use in adolescence. There are also novel findings relating to brain imaging and cognition, for instance regarding familial risk of psychosis in relation to resting state functional MRI. The Northern Finland Birth Cohort 1986 has been utilised frequently in psychiatric research and future data collections are likely to lead to new scientifically important findings. Abbreviations: attention deficit hyperactivity disorder (ADHD); magnetic resonance imaging (MRI)

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Int J Methods Psychiatr Res. 2019 Mar;28:e1751.

EVIDENCE FOR THE RELIABILITY AND PRELIMINARY VALIDITY OF THE ADULT ADHD SELF-REPORT SCALE V1.1 (ASRS V1.1) SCREENER IN AN ADOLESCENT COMMUNITY SAMPLE.

Green JG, DeYoung G, Wogan ME, et al.

OBJECTIVES: There is a need for brief and publicly-available assessments of attention deficit hyperactivity disorder (ADHD) easily administered in large-scale survey efforts monitoring symptoms among adolescents. The ADHD Self-Report Scale v1.1 (ASRS; Kessler et al., 2005) Screener, a six-item measure of ADHD symptoms, is a valid and reliable screening instrument for ADHD among adults. The current study provides initial evidence for the reliability and validity of the ASRS Screener among a community sample of U.S. adolescents.

METHODS: Middle and high school students in grades 6 through 12 (N = 2,472) completed the ASRS Screener, along with the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) and several questions about school functioning.

RESULTS: The ASRS Screener demonstrated good internal consistency, with items captured by a single underlying latent variable, which was invariant across subsamples differing by gender. The ASRS Screener scores were associated with the SDQ subscale measuring hyperactivity/inattention (r = 0.58) and significantly less strongly associated with other SDQ subscale scores (r = -0.15-0.41). The ASRS Screener scores were also significantly associated with student-reported school functioning.

CONCLUSION: Findings suggest directions for future research and provide preliminary support for use of the ASRS Screener as a brief tool for identifying symptoms of ADHD among adolescents

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Int J Methods Psychiatr Res. 2019 Jun;28:e1752.

MENTAL DISORDER COMORBIDITY AND SUICIDAL THOUGHTS AND BEHAVIORS IN THE WORLD HEALTH ORGANIZATION WORLD MENTAL HEALTH SURVEYS INTERNATIONAL COLLEGE STUDENT INITIATIVE.

Auerbach RP, Mortier P, Bruffaerts R, et al.

OBJECTIVES: Comorbidity is a common feature of mental disorders. However, needs assessment surveys focus largely on individual disorders rather than on comorbidity even though the latter is more important for predicting suicidal thoughts and behaviors. In the current report, we take a step beyond this conventional approach by presenting data on the prevalence and correlates (sociodemographic factors, college-related factors, and suicidal thoughts and behaviors) of the main multivariate profiles of common comorbid Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV disorders among students participating in the first phase of the World Health Organization World Mental Health International College Student initiative.
METHOD: A web-based mental health survey was administered to first year students in 19 colleges across eight countries (Australia, Belgium, Germany, Mexico, Northern Ireland, South Africa, Spain, United States; 45.5% pooled response rate) to screen for seven common DSM-IV mental disorders: major depression, mania/hypomania, generalized anxiety disorder, panic disorder, attention-deficit/hyperactivity disorder, alcohol use disorder, and drug use disorder. We focus on the 14,348 respondents who provided complete data; 38.4% screened positive for at least one 12-month disorder.
RESULTS: Multivariate disorder profiles were detected using latent class analysis (LCA). The least common class (C1; 1.9% of students) was made up of students with high comorbidity (four or more disorders, the majority including mania/hypomania). The remaining 12-month cases had profiles of internalizing-externalizing comorbidity (C2; 5.8%), internalizing comorbidity (C3; 14.6%), and pure disorders (C4; 16.1%). The 1.9% of students in C1 had much higher prevalence of suicidal thoughts and behaviors than other students. Specifically, 15.4% of students in C1 made a suicide attempt in the 12 months before the survey compared with 1.3-2.6% of students with disorders in C2-4, 0.2% of students with lifetime disorders but no 12-month disorders (C5), and 0.1% of students with no lifetime disorders (C6).
CONCLUSIONS: In line with prior research, comorbid mental disorders were common; however, sociodemographic correlates of LCA profiles were modest. The high level of comorbidity underscores the need to develop and test transdiagnostic approaches for treatment in college students

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Int J Methods Psychiatr Res. 2019 Mar;28:e1753.

A DATA MINING AND ITEM RESPONSE MIXTURE MODELING METHOD TO RETROSPECTIVELY MEASURE DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS-5 ATTENTION DEFICIT HYPERACTIVITY DISORDER IN THE 1970 BRITISH COHORT STUDY.

Cotton J, Baker ST.

OBJECTIVE: To facilitate future outcome studies, we aimed to develop a robust and replicable method for estimating a categorical and dimensional measure of Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) attention deficit hyperactivity disorder (ADHD) in the 1970 British Cohort Study (BCS70).
METHOD: Following a data mining framework, we mapped DSM-5 ADHD symptoms to age 10 BCS70 data (N = 11,426) and derived a 16-item scale (alpha = 0.85). Mapping was validated by an expert panel. A categorical subgroup was derived (n = 594, 5.2%), and a zero-inflated item response theory (IRT) mixture model fitted to estimate a dimensional measure.
RESULTS: Subgroup composition was comparable with other ADHD samples. Relative risk ratios (ADHD/not ADHD) included boys = 1.38, unemployed fathers = 2.07, below average reading = 2.58, and depressed parent = 3.73. Our estimated measures correlated with two derived reference scales: Strengths and Difficulties Questionnaire hyperactivity (r = 0.74) and a Rutter/Conners-based scale (r = 0.81), supporting

construct validity. IRT model items (symptoms) had moderate to high discrimination (0.90-2.81) and provided maximum information at average to moderate theta levels of ADHD (0.5-1.75).
CONCLUSION: We extended previous work to identify ADHD in BCS70, derived scales from existing data, modeled ADHD items with IRT, and adjusted for a zero-inflated distribution. Psychometric properties were promising, and this work will enable future studies of causal mechanisms in ADHD

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Int J Environ Res Public Health. 2019;16.
EXECUTIVE FUNCTION AND ATTENTION PERFORMANCE IN CHILDREN WITH ADHD: EFFECTS OF MEDICATION AND COMPARISON WITH TYPICALLY DEVELOPING CHILDREN.
Miklas M, Fut+¦ J, Kom+íromy D, et al.
The emerging literature reports that children with Attention-Deficit/Hyperactivity Disorder (ADHD) show deficits in executive functioning. To date, the combination of drug therapy with certain evidence-based non-medication interventions has been proven to be the most effective treatment for ADHD. There is a gap in the literature regarding comparing the executive functions (EF) of treatment na+»ve and medicated children with ADHD with both each other and typically developing children. Altogether, 50 treatment na+»ve and 50 medicated children with ADHD and 50 typically developing children between the ages of six and 12 were enrolled. The Mini International Neuropsychiatric Interview for Children and Adolescents (Mini Kid) and the Test of Attentional Performance for Children (KiTAP) measures were employed. Treatment na+»ve children with ADHD showed weaker performance on most executive function measures (12 out of 15) than either the medicated ADHD group or the controls. There were no significant differences between the medicated ADHD children and typically developing children in most KiTAP parameters (10 out of 15). Executive function impairments were observable in treatment na+»ve ADHD children, which draws attention to the importance of treating ADHD. Future studies should focus on the specific effects of stimulant medication on executive functions

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Int J Environ Res Public Health. 2020;17.
AFFILIATE STIGMA AND RELATED FACTORS IN FAMILY CAREGIVERS OF CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.
Chang C-C, Chen Y-M, Liu T-L, et al.
This cross-sectional questionnaire study examined factors related to affiliate stigma among caregivers of children with attention-deficit/hyperactivity disorder (ADHD) and the association of affiliate stigma with caregiversΓÇÖ unfavorable attitude toward ADHD and moderators. The affiliate stigma of 400 caregivers of children with ADHD was assessed using the Affiliate Stigma Scale. CaregiversΓÇÖ and childrenΓÇÖs factors related to affiliate stigma were examined using multiple regression analysis. Associations of affiliate stigma with caregiversΓÇÖ unfavorable attitudes toward childrenΓÇÖs diagnoses, pharmacotherapy, behavioral therapy, and biological explanations of the etiologies of ADHD were examined using logistic regression analysis. Female caregivers and those caring for girls with ADHD had higher levels of affiliate stigma than did male caregivers and those caring for boys. Higher education levels in caregivers and more severe inattention symptoms in children were associated with higher levels of affiliate stigma. A higher level of affiliate stigma was also significantly associated with unfavorable attitudes toward childrenΓÇÖs diagnoses, pharmacotherapy and behavioral therapy, and etiological explanations for ADHD. Multiple factors of caregivers and children were related to affiliate stigma in caregivers of children with ADHD. Affiliate stigma is significantly associated with caregiversΓÇÖ unfavorable attitude toward ADHD

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Int J Neurosci. 2020.

A SPATIAL PROFILE DIFFERENCE IN ELECTRICAL DISTRIBUTION OF RESTING-STATE EEG IN ADHD CHILDREN USING SLORETA.

Jouzizadeh M, Khanbabaie R, Ghaderi AH.

Purpose: In this article, we propose current source density (CSD) as a marker for diagnosis of Attention Deficit and Hyperactivity Disorder (ADHD) children for the first time.

Materials and methods: A source localization method (sLORETA) was used to find the source of abnormality in the CSD in electrical distribution of different frequency bands in resting state EEG for the ADHD children in comparison to the normal children using statistical nonparametric mapping (SnPM) test. Resting-state EEG in eye-open (EO) condition was recorded from 13 ADHD and 15 age-matched normal children (aged between 6 and 13).

Results: Significant differences were found in the CSD of three frequency bands: delta, theta, and alpha in the parietal lobe, between ADHD and normal groups.

Conclusions: Higher CSD in the parietal lobe for ADHD children was found which suggests that an abnormality exists in the parietal lobe of children with ADHD which can be related to the attention shifting problem in these children

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International Ophthalmology. 2020.

FOVEAL AVASCULAR ZONE AND VESSEL DENSITY IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Tarakcioglu HN, Yilmaz S, Kara T, et al.

Purpose: To compare the retinal and choroidal microvasculature quantitatively via optical coherence angiography (OCTA) in children with attention deficit hyperactivity disorder (ADHD) who were under methylphenidate (MFD) treatment or newly diagnosed as ADHD and were not taking any medication.

Methods: This was a cross-sectional, comparative, and observational study. The children who were between 6 and 17-áyears old and previously diagnosed as ADHD and were under MFD treatment or who were newly diagnosed as ADHD were included in the study. Optical coherence tomography angiography imaging was performed via OCT RT XR Avanti with AngioVue software (Optivue Inc, Freemont, CA). The main outcome measure of the study was OCTA parameters of the children with ADHD.

Results: A total of 186 eyes of 186 patients were included in the study. There were 80 eyes in the control group (newly diagnosed) and 106 eyes in the treatment group (under MFD treatment). The mean duration of methylphenidate use in the treatment group was 33.9 -¦ 20.1-ámonths (between 6 and 84-ámonths). The choriocapillary flow area (p = 0.03), superficial parafoveal thickness (p = 0.01), and deep parafoveal thickness (p = 0.01) were statistically greater in the treatment group than the control group.

Conclusion: Most of the important OCTA parameters especially foveal avascular zone (FAZ) area and FAZ perimeter were similar in the two groups. There was a significant difference between the two groups in parafoveal thickness values which might point to a slight effect of MFD on retinal circulation

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Iran J Psychiatr Behav Sci. 2019;13.

ASSESSMENT OF SERUM LEVELS OF IRON AND ZINC IN CHILDREN WITH ADHD COMPARED TO HEALTHY CONTROLS: A CASE-CONTROL STUDY.

Avval FZ, Soltanifar A, Moharreri F, et al.

Background: Attention deficit hyperactivity disorder (ADHD) is one of the most prevalent psychiatric disorders in both developed and developing countries. Deficiency of vital elements such as iron and zinc is thought to interrupt the function of dopaminergic pathways.

Objectives: This study aimed to assess the serum levels of iron and zinc among children with ADHD who referred to a psychiatric clinic in Mashhad, compared to healthy controls.

Methods: This case-control study was conducted on 51 subjects (36 ADHD cases and 15 healthy controls) aged 6 - 12 years. The serum levels of ferritin and zinc, total iron-binding capacity (TIBC), and hemoglobin

were assessed and compared between the groups. P values of less than 0.05 were considered statistically significant.
Results: The mean age was 7.8 -¦ 2.12 and 8.4 -¦ 3.11 years in ADHD and control children, respectively. There were significant differences between the groups regarding mean corpuscular volume (MCV) (P = 0.003), mean corpuscular hemoglobin concentration (MCHC) (P = 0.002), and zinc level (P = 0.015). However, no significant difference was observed in hemoglobin, iron, TIBC, and ferritin between the two groups (P > 0.05).
Conclusions: The levels of serum iron and ferritin did not differ significantly between children with and without ADHD. Surprisingly, we found the serum zinc level to be higher in ADHD children than in healthy controls. Further studies with larger sample sizes are needed to draw reliable conclusions

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Ir J Psychol Med. 2020.
RETHINKING THE ASSOCIATION BETWEEN OVERWEIGHT/OBESITY AND ADHD IN CHILDREN: A LONGITUDINAL AND PSYCHOSOCIAL PERSPECTIVE.
Donnchadha S., Bramham J, Greene C.
Objective: This study examines the association between attention-deficit/hyperactivity disorder (ADHD) and overweight/obesity in a large-scale longitudinal study of children, while controlling for a range of psychosocial factors.
Method: Data were obtained from Growing Up in Ireland, a nationally representative and longitudinal study of approximately 6500 children who were assessed at 9 and 13 years of age. Body mass index (BMI) was determined using measured height and weight, ADHD status was determined by parent reports of professional diagnoses and ADHD symptoms were measured using the Strengths and Difficulties Questionnaire (SDQ).
Results: The associations between ADHD status, ADHD symptoms (SDQ) and BMI category at age 9 and 13 years were evaluated using logistic regression. Adjustments were made for child factors (sex, developmental coordination disorder, emotional symptoms, conduct problems, birth weight and exercise) and parental factors (socio-economic status, parental BMI, parental depression, and maternal smoking and alcohol use during pregnancy). Logistic regression indicated that ADHD status was not associated with BMI category at 9 or at 13 years of age, but children with ADHD at 9 years were significantly more likely to be overweight/obese at 13 years than those without ADHD. However, when other child and parental factors were adjusted for, ADHD status was no longer significantly associated with weight status. Female sex, low levels of exercise, overweight/obese parents and prenatal smoking during pregnancy consistently increased the odds of childhood overweight/obesity.
Conclusions: While ADHD and overweight/obesity co-occur in general populations, this relationship is largely explained by a variety of psychosocial factors

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J Affect Disord. 2019 Jun;252:160-73.
DIETARY PATTERNS AND ATTENTION DEFICIT/HYPERACTIVITY DISORDER (ADHD): A SYSTEMATIC REVIEW AND META-ANALYSIS.
Del-Ponte B, Quinte GC, Cruz S, et al.
BACKGROUND:
The Attention Deficit Hyperactivity Disorder (ADHD) is a neurobiological disorder characterized by persistent symptoms of inattention, impulsivity and hyperactivity. The diet during childhood has been investigated as a factor potentially involved in the ADHD etiology.
OBJECTIVE: To review systematically the evidence of the association between dietary patterns and ADHD.
METHODS: Two independent literature searches were carried out in PubMed, LILACS and PsycINFO databases. The studies included were only those that assessed dietary patterns and ADHD in children and adolescents. Due to heterogeneity between the studies random-effects models were used to pool the estimates.

RESULTS: We included fourteen observational studies (four cohorts, five case-control and five cross-sectional studies). In the pooled analysis, healthy dietary patterns were protective against ADHD (OR: 0.65; 95% CI: 044 - 0.97), while unhealthy dietary patterns were found as risk to ADHD (OR: 1.41; 95% CI: 1.15-1.74). After stratifying the studies by design (cohort/case control or cross-sectional), continent (Europe or Asia/Oceania) and sample size (≥1000 or <1000) the effects remained.
LIMITATIONS: Absence of randomized controlled trials at the literature on this subject and scarce evidence from more robust designs, such as cohort and case-control studies.
CONCLUSION: This study suggests that a diet high in refined sugar and saturated fat can increase the risk, whereas a healthy diet, characterized by high consumption of fruits and vegetables, would protect against ADHD or hyperactivity. Nevertheless, giving the number and the design of most of the studies available in the literature, the current evidence is weak. More studies using longitudinal design need to be performed to reinforce this evidence

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J Consult Clin Psychol. 2019 Nov;87:1030-42.
WHAT COGNITIVE PROCESSES ARE "SLUGGISH" IN SLUGGISH COGNITIVE TEMPO?
Kofler MJ, Irwin LN, Sarver DE, et al.
OBJECTIVE: Sluggish cognitive tempo refers to a constellation of symptoms that include slowed behavior/thinking, reduced alertness, and getting lost in one's thoughts. Despite the moniker "sluggish cognitive tempo," the evidence is mixed regarding the extent to which it is associated globally with slowed (sluggish) mental (cognitive) information processing speed (tempo).
METHOD: A well-characterized clinical sample of 132 children ages 8-13 years (M = 10.34, SD = 1.51; 47 girls; 67% White/non-Hispanic) were administered multiple, counterbalanced neurocognitive tests and assessed for sluggish cognitive tempo symptoms via multiple-informant reports.
RESULTS: Bayesian linear regressions revealed significant evidence against associations between sluggish cognitive tempo and computationally modeled processing speed (BF01 > 3.70), and significant evidence for associations with slower working memory manipulation speed. These findings were consistent across parent and teacher models, with and without control for attention-deficit/hyperactivity disorder inattentive symptoms and IQ. There was also significant evidence linking faster inhibition speed with higher parent-reported sluggish cognitive tempo symptoms.
CONCLUSIONS: These findings provide strong evidence against characterizing children with sluggish cognitive tempo symptoms as possessing a globally sluggish cognitive tempo. Instead, these symptoms appear to be related, to a significant extent, to executive dysfunction characterized by working memory systems that are too slow and inhibition systems that are too fast. Behaviorally, these findings suggest that requiring extra time to rearrange the active contents of working memory delays responding, whereas an overactive inhibition system likely terminates thoughts too quickly and therefore prevents intended behaviors from starting or completing, thereby giving the appearance that children are absent-minded or failing to act when expected

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J Pediatr Orthop. 2019 Nov;39:500-04.
RISK FACTORS FOR PROLONGED POSTOPERATIVE OPIOID USE AFTER SPINAL FUSION FOR ADOLESCENT IDIOPATHIC SCOLIOSIS.
Yang S, Werner BC.
BACKGROUND: Opioids are commonly used after posterior spinal instrumented fusion (PSIF) for adolescent idiopathic scoliosis (AIS). Prescription opioids use can potentially lead to misuse, abuse, dependence, and overdose death. Prolonged opioid use has not been extensively studied in the postoperative AIS population. The purpose of this study is to identify risk factors associated with prolonged opioid use after PSIF for AIS.
METHODS: A large insurance database was queried for AIS patients undergoing PSIF. Patients with prolonged postoperative opioid use were defined as those receiving new prescriptions for an opioid

medication >6 weeks following the date of surgery, up to 8 months postoperatively. Preoperative and intraoperative risk factors for prolonged opioid use were then examined, including the number of spinal levels fused, preoperative opioid prescriptions, demographic variables, pertinent comorbidities (anxiety, depression, attention deficit hyperactivity disorder, and autism) and other preoperative prescriptions (anxiolytics, antidepressants, nonopioid analgesics, neuropathic medications, and attention deficit hyperactivity disorder medications). Each variable's independent risk for prolonged postoperative opioid use was examined utilizing a multivariable binomial regression analysis. P<0.05 was considered statistically significant.
RESULTS: A total of 511 patients were included in the study. Of this 50 patients (9.78%) were found to have prolonged opioid use following scoliosis surgery. Preoperative opioid use (odds ratio, 2.93; P<0.001) was the most significant predictor of prolonged postoperative opioid use. In addition, female sex, obesity, a preoperative diagnosis of anxiety and a preoperative prescription for a muscle relaxer were also significant positive risk factors for prolonged postoperative opioid use. Several factors were found to be protective against prolonged postoperative opioid use. Fewer total fusion levels, compared with >/=13 levels, had a significantly lower risk of prolonged opioid use. Preoperative anxiolytic and antidepressant use were also both negative predictors of prolonged opioid use.
CONCLUSIONS: Efforts at addressing preoperative opioid use, anxiety, obesity, and providing multimodal pain management strategies should be considered to reduce additional postoperative opioid prescriptions after PSIF for AIS. LEVEL OF EVIDENCE: Level III-retrospective comparative study

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JAMA Network Open. 2019;2.
ASSOCIATION BETWEEN GREENNESS SURROUNDING SCHOOLS AND KINDERGARTENS AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN CHILDREN IN CHINA.
Yang B-Y, Zeng X-W, Markevych I, et al.
Importance: Few studies have investigated the association between greenness and childhood attention-deficit/hyperactivity disorder (ADHD).
Objective: To evaluate the association between greenness surrounding schools or kindergartens and symptoms of ADHD in children.
Design, Setting, and Participants: This population-based cross-sectional study was performed between April 2012 and January 2013 in 7 cities in northeastern China. This analysis included 59 754 children (aged 2-17 years) from 94 schools and kindergartens, who had resided in the study area for 2 years or longer. Data were analyzed from April 15, 2019, to October 10, 2019.
Exposures: Greenness surrounding each child's school or kindergarten was estimated using 2 satellite image-derived vegetation indexes: the normalized difference vegetation index and the soil-adjusted vegetation index.
Main Outcomes and Measures: Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) scales were used to measure ADHD symptoms (9 inattention symptoms and 9 hyperactivity-impulsivity symptoms). Parents or guardians rated the frequency of each of 18 ADHD symptoms during the preceding 6 months. Children with 6 or more symptoms of either inattention or hyperactivity-impulsivity were defined as having ADHD symptoms. Generalized linear mixed models were applied to estimate the association between greenness and ADHD symptoms.
Results: The mean (SD) age of the 59 754 study participants was 10.3 (3.6) years, and 29494 (49.4%) were girls. A total of 2566 participants (4.3%) had ADHD symptoms. Greenness levels differed substantially across schools and kindergartens. The normalized difference vegetation index within 500 m of a school or kindergarten ranged from -0.09 to 0.77. Greater greenness levels were associated with lower odds of ADHD symptoms. In covariate-adjusted models, a 0.1-unit increase in normalized difference vegetation index or soil-adjusted vegetation index within 500 m of a school or kindergarten was significantly associated with lower odds of ADHD symptoms (odds ratios, 0.87 [95% CI, 0.83-0.91] and 0.80 [95% CI, 0.74-0.86], respectively; P <.001 for both). The associations were robust in a series of sensitivity analyses.
Conclusions and Relevance: These findings suggest that there may be a beneficial association between school-based greenness and ADHD symptoms in Chinese children. Future longitudinal and mechanistic

studies are needed to confirm the findings of this cross-sectional analysis and further explore potential mechanisms of this association.

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JAMA Network Open. 2019.

ASSOCIATION BETWEEN OBJECTIVELY MEASURED SLEEP DURATION AND SYMPTOMS OF PSYCHIATRIC DISORDERS IN MIDDLE CHILDHOOD.

Ranum BM, et al.

Importance: The long-term association between sleep duration and mental health in children is currently unknown.

Objective: To investigate the prospective associations between sleep duration and symptoms of emotional and behavioral disorders at ages 6, 8, 10, and 12 years.

Design, Setting, and Participants: This population-based cohort study obtained data from the Trondheim Early Secure Study in Trondheim, Norway. A representative, stratified random sample of children born between January 1, 2003, and December 31, 2004, were invited to participate. Participants were followed up biennially from age 4 years (2007-2008) to 12 years (2013-2014). Data analysis was conducted from January 2, 2019, to May 28, 2019.

Main Outcomes and Measures: Sleep duration was assessed with 1 week of continuous use of a triaxial accelerometer. Symptoms of emotional (anxiety and depression) and behavioral (oppositional defiant, conduct, and attention-deficit/hyperactivity) disorders were measured by semistructured clinical interviews (using the Preschool Age Psychiatric Assessment and the Child and Adolescent Psychiatric Assessment) with parents (at all ages) and children (from age 8 years).

Results: The analytical sample comprised 799 children (mean [SD] age at time point 2, 6.0 [0.2] years; 405 [50.7%] boys; and 771 [96.5%] Norwegian). Shorter sleep duration at age 6 years (+¦ [unstandardized regression coefficient] = -0.44; 95% CI, -0.80 to -0.08; P =.02) and 8 years (+¦ = -0.47; 95% CI, -0.83 to -0.11; P =.01) forecasted symptoms of emotional disorders 2 years later. Comparatively short sleep duration at age 8 years (+¦ = -0.65; 95% CI, -1.22 to -0.08; P =.03) and 10 years (+¦ = -0.58; 95% CI, -1.07 to -0.08; P =.02) was associated with symptoms of behavioral disorders 2 years later among boys but not among girls at age 8 years (+¦ = -0.14; 95% CI,- 0.52 to 0.24; P =.48) or 10 years (+¦ = -0.05; 95% CI, = -0.49 to 0.40; P =.84). These associations were statistically significant among boys compared with girls at age 8 years (+21 = 13.26; P <.001) and 10 years (+21 = 10.25; P =.001). Symptoms of psychiatric disorders did not forecast sleep duration at any age.

Conclusions and Relevance: This study found an association between short sleep duration and increased risk of future occurrence of emotional disorder symptoms in both boys and girls and between reduced sleep and behavioral disorder symptoms in boys. These results suggest that improving sleep in children may help protect against the development of symptoms of common psychiatric disorders and may be advantageous in the treatment of such disorders

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J Affective Disord. 2020;264:304-09.

ASSOCIATION BETWEEN BDNF GENE POLYMORPHISMS AND ATTENTION DEFICIT HYPERACTIVITY DISORDER IN SCHOOL-AGED CHILDREN IN WUHAN, CHINA.

Luo L, Jiang X, Cao G, et al.

Background: Brain-derived neurotrophic factor (BDNF) is vital for neuronal survival and growth, regulation of synaptic plasticity, and cognitive function. Previous studies examined the role of BDNF in susceptibility to attention deficit hyperactivity disorder (ADHD). The current study examined the association between BDNF gene polymorphisms and ADHD in Chinese children.

Methods: Participants were 195 medication-naive ADHD children and 263 unaffected healthy controls. ADHD symptoms were diagnosed using the Vanderbilt ADHD Diagnostic Parental Rating Scale according to the Diagnostic and Statistical Manual of Mental Disorders-5. Five BDNF single nucleotide polymorphisms were detected using improved multiplex ligation detection reaction. Alleles and genotype frequency were

examined using Chi-square tests. Correlations were examined using multivariate logistic regression analysis in the ADHD and control groups.
Results: The results revealed that rs12291186 with one or both mutated allele(s) was significantly associated with reduced likelihood of ADHD (OR = 0.13, 95% CI: 0.02ΓÇô0.77) and ADHD-Combined (OR = 0.10, 95% CI: 0.01ΓÇô0.85). Children with genotype AA or CA in rs10835210 exhibited increased risk of ADHD (OR = 3.29, 95% CI: 1.03ΓÇô10.55) and ADHD-Combined (OR = 4.45, 95% CI: 1.10ΓÇô17.96) compared with genotype CC children. No significant associations were found between rs6265, rs7103411, rs7103873 polymorphisms and ADHD. Limitations: Participants were recruited from urban areas. We were unable to examine all potential confounding factors.
Conclusions: BDNF gene polymorphisms of rs12291186 and rs10835210 were related to the occurrence of ADHD. These findings provide new insight on mechanisms underlying BDNF gene in ADHD

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J Affective Disord. 2020;265:200-06.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD) SYMPTOMS AND SUICIDALITY IN CHILDREN: THE MEDIATING ROLE OF DEPRESSION, IRRITABILITY AND ANXIETY SYMPTOMS.

Levy T, Kronenberg S, Crosbie J, et al.

Background: Attention-deficit/hyperactivity disorder (ADHD) is associated with increased suicidality risk. Yet, potential mechanisms transmitting the effect of ADHD to suicidality remain unclear. We investigated whether depression, irritability and anxiety symptoms mediate between ADHD symptoms and suicidality.
Methods: ADHD, depression, irritability and anxiety symptoms as well as suicidality (composited of suicidal ideation, attempts or self-harm) were measured in an outpatient clinic for ADHD (N = 1,516, 6-17 years old, 61.1% diagnosed with ADHD) using parent and teacher questionnaires. Multiple mediator models adjusted for age, sex and psychosocial adversities were constructed separately for parent- and teacher-report.
Results: Parents reported higher rates of suicidality than did teachers (12.1% and 3.8%, p < .001). Suicidality was associated with parent (OR = 1.10, 95%CI: 1.07-1.14) and teacher (OR = 1.08, 95%CI: 1.03-1.15) reported ADHD symptoms. The association between ADHD symptoms and suicidality was mediated by both parent- and teacher-reported depression (39.1% and 45.3% of total effect, respectively) and irritability symptoms (36.8% and 38.4% of total effect, respectively). Anxiety symptoms mediated between ADHD and suicidality for parent- but not teacher-report (19.0% of total effect). No direct effect of ADHD symptoms was found once depression, irritability and anxiety were controlled.
Limitations: The cross-sectional design limits the ability to determine causal order between mediators and outcome.
Conclusions: Our results confirmed the association between ADHD symptoms and suicidality. However, this association was indirect and fully mediated by symptoms of depression, irritability and anxiety. Assessing these symptoms may enable an estimate of suicidality and help managing suicidal risk in ADHD

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J Autism Dev Disord. 2020.

LONGITUDINAL DIFFERENCES IN RESPONSE TO NAME AMONG INFANTS DEVELOPING ASD AND RISK FOR ADHD.

Hatch B, Iosif A-M, Chuang A, et al.

Diminished response to name, a potential early marker of autism spectrum disorder (ASD), may also indicate risk for other disorders characterized by attention problems, including attention-deficit/hyperactivity disorder (ADHD). Using a familial risk design, we examined whether response to name ability at 6, 12, 18, 24, and 36-ámonths of age differed between three 36-month outcome groups: ASD, ADHD Concerns, or a Comparison group. Persistent differences between the ASD and Comparison groups were evident beginning at 12-ámonths; differences between the ADHD Concerns and Comparison groups were evident between 12 and 18-ámonths only. Results suggest that response to name may be a general marker for ASD and ADHD risk in infancy but a specific indicator of ASD by 24-months

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J Child Psychol Psychiatry. 2020 Jan;61:51-61.

DATA-DRIVEN IDENTIFICATION OF SUBTYPES OF EXECUTIVE FUNCTION ACROSS TYPICAL DEVELOPMENT, ATTENTION DEFICIT HYPERACTIVITY DISORDER, AND AUTISM SPECTRUM DISORDERS.

Vaidya CJ, You X, Mostofsky S, et al.

Background: Impairment of executive function (EF), the goal-directed regulation of thoughts, actions, and emotions, drives negative outcomes and is common across neurodevelopmental disorders including attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD). A primary challenge to its amelioration is heterogeneity in symptom expression within and across disorders. Parsing this heterogeneity is necessary to attain diagnostic precision, a goal of the NIMH Research Domain Criteria Initiative. We aimed to identify transdiagnostic subtypes of EF that span the normal to impaired spectrum and establish their predictive and neurobiological validity.

Methods: Community detection was applied to clinical parent-report measures in 8–14-year-old children with and without ADHD and ASD from two independent cohorts (discovery N = 320; replication N = 692) to identify subgroups with distinct behavioral profiles. Support vector machine (SVM) classification was used to predict subgroup membership of unseen cases. Preliminary neurobiological validation was obtained with existing functional magnetic resonance imaging (fMRI) data on a subsample (N = 84) by testing hypotheses about sensitivity of EF subgroups versus DSM categories.

Results: We observed three trans diagnostic EF subtypes characterized by behavioral profiles that were defined by relative weakness in: (a) flexibility and emotion regulation; (b) inhibition; and (c) working memory, organization, and planning. The same tripartite structure was also present in the typically developing children. SVM trained on the discovery sample and tested on the replication sample classified subgroup membership with 77.0% accuracy. Split-half SVM classification on the combined sample (N = 1,012) yielded 88.9% accuracy (this SVM is available for public use). As hypothesized, frontal-parietal engagement was better distinguished by EF subtype than DSM diagnosis and the subgroup characterized with inflexibility failed to modulate right IPL activation in response to increased executive demands.

Conclusions: The observed transdiagnostic subtypes refine current diagnostic nosology and augment clinical decision-making for personalizing treatment of executive dysfunction in children

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J Clin Diagn Res. 2019;13:VC12-VC15.

ASSESSING SOCIAL SKILLS OF CHILDREN DIAGNOSED WITH AUTISM SPECTRUM DISORDERS IN INDIA: A PILOT STUDY.

Gupta R, Sahni R.

Introduction: The prevalence of Autism is increasing now-a-days in India so there is an evident need to develop early intervention programs targeting social-communication and behavioural skills of children with Autism Spectrum Disorders (ASD) that are applicable in the Indian setting. However, a lack of adequate measurement of social skills, hampers the evaluation of effectiveness of such programs.

Aim: To evaluate the correlation between Social Skills Rating Scale (SSRS) and Indian Scale for Assessment of Autism (ISAA) and to find out the validity of SSRS in Indian children.

Materials and Methods: The present study was an observational study. Fifty children diagnosed with ASD between 3-6 years as per the DSM-V criteria were recruited from March 2016 to Febuary 2017. Social Skills were assessed on SSRS and severity of autism was assessed on ISAA. Pearson correlation coefficient were calculated between seven subdomains of SSRS and total score of ISAA to evaluate the validity of SSRS.

Results: A significant negative correlation was found between Social Skills and total score of ISAA ($r=-0.61$, $p<0.01$) and positive correlation between problem behaviours and ISAA total score ($r=0.60$, $p<0.01$).

Conclusion: The study concluded that SSRS may be used to assess the social skills of children with ASD in Indian setting

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Journal of Clinical Medicine. 2020;9.

INTACT STIMULUS□ÇÔRESPONSE CONFLICT PROCESSING IN ADHD□ÇÖMULTILEVEL EVIDENCE AND THEORETICAL IMPLICATIONS.

Bluschke A, et al.

Attention-deficit-hyperactivity disorder (ADHD) is closely associated with deficits in cognitive control. It seems, however, that the degree of deficits strongly depends on the examined subprocess, with the resolution of stimulus-stimulus conflicts being particularly difficult for patients with ADHD. The picture is far less clear regarding stimulusΓÇôresponse conflicts. The current study provides multi-level behavioural and neurophysiological data on this type of conflict monitoring in children with ADHD compared to healthy controls. To account for the potentially strong effects of intra-individual variability, electroencephalogram (EEG) signal decomposition methods were used to analyze the data. Crucially, none of the analyses (behavioural, event-related potentials, or decomposed EEG data) show any differences between the ADHD group and the control group. Bayes statistical analysis confirmed the high likelihood of the null hypothesis being true in all cases. Thus, the data provide multi-level evidence showing that conflict monitoring processes are indeed partly intact in ADHD, even when eliminating possible biasing factors such as intra-individual variability. While stimulus-stimulus conflict processing has been shown to be consistently dysfunctional in ADHD, the resolution of stimulus-response conflicts is not deficient in this patient group. In comparison to other studies, the results provide novel theoretical insights into the nature of conflict control deficits in childhood ADHD

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J Clin Psychiatry. 2020;81.

FUNCTIONAL IMPAIRMENT IN YOUTH WITH ADHD: NORMATIVE DATA AND NORM-REFERENCED CUTOFF POINTS FOR THE BEFORE SCHOOL FUNCTIONING QUESTIONNAIRE AND THE PARENT RATING OF EVENING AND MORNING BEHAVIOR SCALE, REVISED.

Faraone SV, DeSousa NJ, Komolova M, et al.

Objective: Children with attention-deficit/hyperactivity disorder (ADHD) frequently manifest behavioral difficulties in the morning prior to school and in the afternoons and evenings. We sought to establish norms for 2 timespecific measures of functioning: the Before School Functioning Questionnaire (BSFQ) and the Parent Rating of Evening and Morning Behavior Scale, Revised (PREMB-R), which includes Morning (AM) and Evening (PM) subscales.

Methods: The normative online survey of a representative US sample of 1,200 primary caregivers of children and adolescents aged between 6 and 17 years was conducted in June 2016. A quota system was used whereby caregivers of 50 male and 50 female children or adolescents were recruited in each age group, ie, 100 parents for each of the 12 age groups. Diagnosis of ADHD relied on a caregiver's report that his or her child was so diagnosed by a health professional.

Results: Across all items of the BSFQ, youth with current untreated ADHD or a history of ADHD were rated as more severely ill than those without ADHD (all unadjusted P values < .001), even after adjustment for psychiatric comorbidity (all adjusted P values < .001). A similar pattern was observed for the PREMB-R AM (all unadjusted P values < .001; all adjusted P values < .001, except for item 1 [P = .01]) and PREMB-R PM (all unadjusted P values < .001; all adjusted P values < .001). The use of a large population sample allowed for computation of age-stratified norms for 4 thresholds of risk: screening risk (80th percentile), mild functional impairment (90th percentile), moderate functional impairment (93rd percentile), and severe functional impairment (98th percentile).

Conclusions: The norms generated by this study can guide clinicians in the use of the BSFQ and PREMB-R for identifying those ADHD youth who may be experiencing difficulties in the early morning and late afternoon/evening. Such tools are needed given the availability of treatments that can target ADHD symptoms and impairments at these extremes of the daily routine

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J Clin Psychol. 2020 Jan;76:239-45.

PARENTING PRACTICES AMONG PARENTS OF CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: GENDER-RELATED DIFFERENCES.

Muñoz-Suazo MD, Navarro-Muñoz J, Díaz-Román A, et al.

Objective: Further research is needed on parenting practices among parents of children with attention-deficit/hyperactivity disorder (ADHD), as these practices impact children's development and outcomes. This study analyzes these practices, distinguishing between parents' and children's gender.

Method: Parental warmth (affection–communication and criticism–rejection responses) and control (inductive, strict, and indulgent discipline styles) were assessed in both parents of 81 children diagnosed with ADHD (aged 6–17 years).

Results: Mothers reported greater affection–communication responses and use of inductive disciplinary practices than fathers. Higher use of maternal strict practices was associated with female children, regardless of their age, subtype, medication, or comorbidities. However, parental practices used with male children were affected by children's age and subtype.

Conclusions: Warmth levels and discipline styles used by parents of children with ADHD may differ depending on the gender of both parents and children. The implications of these findings for understanding gender differences associated with ADHD are discussed

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J Nerv Ment Dis. 2019;207:869-74.

THE ASSOCIATION BETWEEN CHILD ABUSE AND EMOTIONAL AND BEHAVIORAL PROBLEMS IN CHINESE SCHOOL-AGED BOYS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Zou S, Yu W, Liang S, et al.

The aim of our study was to investigate the relationship between child abuse and emotional and behavioral problems in Chinese school-aged boys with attention deficit hyperactivity disorder (ADHD). Forty-eight school-aged boys with ADHD and 77 male healthy controls completed the final assessments that included the Child Behavior Checklist, the Barratt Impulsiveness Scale Version 11, the Screen for Child Anxiety Related Disorders, the Depression Self-Rating Scale for Children, and the Childhood Trauma Questionnaire, Short Form. Our findings showed that child abuse could associate with the behavioral problems in ADHD. Regression analysis further showed that child abuse (especially emotional abuse and physical abuse), adverse living conditions, and school anxiety significantly could be contributors to behavioral problems in boys with ADHD. Our study indicated that child abuse may be associated with the behavioral problems in Chinese school-aged boys with ADHD

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J Am Acad Child Adolesc Psychiatry. 2019.

A RANDOMIZED CONTROLLED TRIAL OF INTERVENTIONS FOR GROWTH SUPPRESSION IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER TREATED WITH CENTRAL NERVOUS SYSTEM STIMULANTS.

Waxmonsky JG, Pelham WE, Campa A, et al.

Objective: To examine the impact of central nervous system (CNS) stimulants on the growth of children with attention-deficit/hyperactivity disorder (ADHD), and to assess the efficacy and feasibility of weight recovery interventions on growth.

Method: A total of 230 children aged 5 to 12 years with ADHD with no history of chronic CNS stimulant use were randomly assigned to receive daily CNS stimulants (78%, primarily OROS-methylphenidate [OROS-MPH]) or behavioral treatment (22%) for 30 months. After 6 months, children evidencing a decline in body mass index (BMI) of >0.5 z-units were randomized to 1 of 3 weight recovery treatments (WRTs): monthly monitoring of height/weight (MON) plus continued daily medication; drug holidays (DH) with medication limited to school days; or daily caloric supplementation (CS) with a 150-kcal supplement plus daily medication.

Results: Before WRT assignment, medication was associated with significant reductions in standardized weight and height (p values <.01). Adherence to CS and DH during WRT was high, with significant increases

in daily caloric intake and decreases in weekly medication exposure (p values <.05). Across all WRT participants (n = 71), weight velocity increased significantly after WRT randomization (+¦2 = 0.271, SE = 0.027, p < .001). When analyzed by what parents did (versus what they were assigned to), CS (p < .01) and DH (p < .05) increased weight velocity more than MON. No increase in height velocity was seen after randomization to any WRT. Over the entire study, WRT participants declined in standardized weight (0.44 z-units) and height (0.20 z-units).
Conclusion: Drug holidays, caloric supplementation, and increased monitoring all led to increased weight velocity in children taking CNS stimulants, but none led to increased height velocity.
Clinical trial registration information: Novel Approach to Stimulant Induced Weight Suppression and Its Impact on Growth; https://clinicaltrials.gov/; NCT01109849

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J Trace Elem Med Biol. 2020;58.
SERUM ZINC, COPPER, ZINC-TO-COPPER RATIO, AND OTHER ESSENTIAL ELEMENTS AND MINERALS IN CHILDREN WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER (ADHD).
Skalny AV, Mazaletskaya AL, Ajsuvakova OP, et al.
Background: Essential trace elements and minerals play a significant role in neurodevelopment. Although certain studies demonstrated impaired essential trace element and mineral status in children with ADHD, the existing data are insufficient. The objective of the present study was to assess serum trace element and mineral levels in children with ADHD.
Methods: Serum trace element and mineral levels in 68 children with ADHD and 68 neurotypical controls were assessed using ICP-MS at NexION 300D (PerkinElmer Inc., USA) equipped with ESI SC-2 DX4 autosampler (Elemental Scientific Inc., USA).
Results: Serum Cr, Mg, and Zn levels in children with ADHD were 21 % (p = 0.010), 4 % (p = 0.005), and 7 % (p = 0. 001) lower as compared to the healthy controls, respectively. In turn, serum Cu/Zn values were 11 % higher than those in the control group. Age and gender had a significant impact on serum element levels in ADHD. Particularly, preschool children were characterized by significantly increased Cu (+8 %; p = 0.034), and Cu/Zn (+19 %; p < 0.001) values, whereas serum Zn (-9 %; p = 0.004) level was decreased. In primary school-aged children only 6 % (p = 0.007) lower Mg levels were observed. Both boys and girls with ADHD were characterized by 8 % (p = 0.016) lower serum Zn levels and 10 % (p = 0.049) higher Cu/Zn values when compared to neurotypical girls. Boys with ADHD also had significantly higher Cu/Zn, exceeding the respective control values by 12 % (p = 0.021), predominantly due to a 7 % (p = 0.035) decrease in serum Zn. Serum Mg levels were also found to be significantly lower than those in neurotypical children by 5 % (p = 0.007). In adjusted regression models serum Cr (+¦=-0.234; p = 0.009) and Cu/Zn (+¦ = 0.245; p = 0.029) values were significantly associated with ADHD, respectively. Two-way ANOVA revealed a significant impact of ADHD on Cr, Mg, Zn, and Cu/Zn, whereas age was associated with Cu, I, Mg, Mo, and Cu/Zn, whereas gender accounted only for variability in serum Mn levels. Principal component analysis (PCA) also revealed significant contributions of Mg, Zn, and Cu/Zn values to ADHD variability.
Conclusions: Hypothetically, the observed decrease of essential trace elements, namely Mg and Zn, and elevation of Cu/Zn may significantly contribute to the risk of ADHD or its severity and/or comorbidity

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Kindheit und Entwicklung: Zeitschrift für Klinische Kinderpsychologie. 2020 Jan;29:40-51.
BELASTUNGSERLEBEN VON MÜTTERN MIT KINDERN MIT ADHS: EINFLUSS DER ADHS-ERSCHEINUNGSFORMEN UND DER ELTERLICHEN SYMPTOMATIK = STRESS EXPERIENCE OF MOTHERS OF CHILDREN WITH ADHD: INFLUENCE OF THE ADHD PRESENTATION AND PARENTAL PSYCHOPATHOLOGY.
Schwörer MC, Nitkowski D, Petermann F, et al.
Parents of children with attention deficit hyperactivity disorder (ADHD) report a high level of psychological stress associated with the child's symptoms, but this can also be attributed to the frequently comorbid oppositional defiant disorder (ODD). In addition, parents often have their own psychopathological symptoms,

which contributes to the stress experience. The study involved 207 children (M = 9.00 years; SD = 1.52; 65.2% male). The aim of the study was first to analyze whether the maternal stress differs depending on ADHD presentation and whether there is a comorbid symptomatology of ODD. The children with ADHD symptoms (n = 138) were divided into groups depending on ADHD presentation and signs of ODD (DSM-5; ADHS-KJ; Petermann & Petermann, 2019) and were examined in terms of maternal stress experience (EBI, Eltern-Belastungs-Inventar; Tröster, 2011). Group differences were analyzed using a multivariate variance analysis. Furthermore, it was investigated, which symptoms and control variables best explain maternal stress in children (ADHD and ODD) and parents (depression; EBI and ADHD; Schmidt & Petermann, 2013), which was calculated with a stepwise multiple regression (n = 157). The results show a significant main effect between the different ADHD presentations on the scales of Mood and Adaptability. In addition, a significant interaction effect of ADHD presentation, sex, and ADHD-specific drug use was demonstrated on the EBI scale of Acceptability. Sidak post-hoc tests showed the highest maternal stress for children with ADHD+ODD (independent of ADHD presentation); medium-tolarge effect sizes were found (d = .69 to 1.50). Furthermore, maternal depression proved to be the most important predictor of maternal stress (ß = 0.45). Combined presentation with ODD (ß = 0.37), inattentive presentation with ODD (ß = 0.16), the impulse control/disinhibition of mothers (ß = 0.15), the number of children living in the household (ß = 0.11), and the attention control of mothers (ß = 0.11) were able to clarify further variance, resulting in an overall model of Rkorr 2 = 0.60. In the clinical context, mothers of children with ADHD should be specifically examined for depressive symptoms, and questionnaire procedures for parental symptoms should be collected. In the case of indications of the presence of their own symptoms, clinical diagnostic or therapy recommendations should be made, as otherwise the therapy goals would be at risk (e. g., owing to lack of support in practicing the therapy contents). The parental ADHD should be clarified because of the high heredity, since this can intensify the symptoms of the child. Additionally, behavioral therapeutic measures should be carried out that are adapted to the ADHD presentation of the child in order to guarantee a targeted stress reduction in mothers

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L'Encéphale: Revue de psychiatrie clinique biologique et thérapeutique. 2019 Dec;45:494-500.

RÔLE DE L'IMPULSIVITÉ DANS LA RELATION ENTRE SURPOIDS ET TDAH CHEZ L'ENFANT: ÉTUDE EXPLORATOIRE DES CARACTÉRISTIQUES CLINIQUES, NEUROPSYCHOLOGIQUES ET NEUROBIOCHIMIQUES = IMPULSIVITY AND OBESITY IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER: A CLINICAL, NEUROPSYCHOLOGICAL AND MAGNETIC RESONANCE SPECTROSCOPY EXPLORATORY STUDY.

Ben Amor L, Lachal J.

Objectives: Relationship between Attention Deficit Hyperactivity Disorder (ADHD) and obesity in adults and children had previously been established in research studies. Brain imaging studies pointed out the important role of the prefrontal region in both ADHD and obesity. However, the underlying link between ADHD and obesity is not well understood. The hypothesis that impulsivity could play a role has been explored in clinical studies of ADHD and Binge Eating Disorders or Loss of Control Eating, with contradictory results. Our study aims to compare children with ADHD and obesity to children with ADHD and normal weight. We propose to compare these two populations with clinical, neuropsychological and brain spectroscopy investigation, focusing specifically on impulsivity items.

Method: Ten children presenting overweight or obesity were selected from a larger population of children with ADHD (5–12y) and paired with regard to gender and age with ten children with ADHD and normal weight from the same population. Conners Rating scales version parents (CPRS) and teachers (CTRS), Conners' Continuous Performance Test II (CPT-II), and Magnetic Resonance Spectroscopy (MRS) metabolites in five regions of interest (left and right prefrontal, left and right striatal and left cerebellum regions) were measured for all the children. For MRS, ratio to creatinine levels of following metabolites were measured: glycerophosphocholine+phosphocholine/creatinine (GPC+PCh/Cr), glutamate+glutamine (Glu+Gln/Cr), myoinositol (mI/Cr) et N-acétylaspartate+N-acétylaspartylglutamate (NAA+NAAG/Cr).

Results: Hyperactivity/Impulsivity and Conners Global Index (CGI) subscales of Conners rating scales showed a higher rate of impulsivity in children with ADHD and obesity as compared to children with ADHD and normal weight. Neuropsychological results were comparable in the two groups. Finally, MRS showed a

higher GPC+PCh/Cr ratio in right prefrontal cortex in children with ADHD and obesity as compared to children with ADHD and normal weight.
Conclusions: Our results are concordant with the hypothesis that impulsivity could be the link between obesity and ADHD in a population of children with ADHD. The right prefrontal regions seem to be areas of interests that need more research in the study of the link between obesity and ADHD

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Medicina (Argentina). 2019;79:33-36.
SLEEPNESS IN NEURODEVELOPMENTAL DISORDERS.
Mulas F, Rojas M, Gand+¡a R.
The development and establishment of the normal sleep patterns are very important processes in the final anatomical and physiological architecture of the central nervous system. The relationship between sleep disturbances during childhood with neurodevelopmental disorders is complex and potentially synergistic. Sleep patterns are present since the fetal period but their structure and physiology is modified according with the maturation of the central nervous system. Sleep disorders and their relationship with attention deficit hyperactivity disorders(ADHD), autism spectrum disorders(ASD) and other neurodevelopmental disorders (TDN) are not well understood yet, but significant progresses have been made in understanding associations and potential etiological correlations. We reviewed sleep disturbances in NDT, in ADHD and in ASD. A greater understanding of the pleiotropic functions of the genes involved in sleep-wake cycle disorders and deviations from neurological development could lead to new diagnostic and therapeutic strategies in an early stage in order to improve the quality of life of the patient, relatives and caregivers

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Medicine (Baltimore). 2020 Jan;99:e18565.
EFFICACY AND SAFETY OF SO-CHEONG-RYONG-TANG IN PATIENTS WITH ATOPIC DERMATITIS AND RESPIRATORY DISORDERS: STUDY PROTOCOL OF A DOUBLE-BLIND RANDOMIZED PLACEBO-CONTROLLED TRIAL.
Kang ***SJ, Cho HB, Jo EH, et al***.
BACKGROUND: Atopic dermatitis (AD, atopic eczema) is a pruritic, inflammatory, chronic skin disease. Since there is limitation of conventional treatment of AD, traditional herbal medicine can be an attractive therapeutic option in patients having AD for a long time. So-Cheong-Ryong-Tang (SCRT) has been found to inhibit histamine release and degranulation of mast cells, differentiation of basophils, and proliferation of eosinophils. We designed this clinical trial to evaluate the efficacy and safety of SCRT as compared to placebo in patients with AD and respiratory disorders.
METHODS/DESIGN: This study is a single-center, randomized, double-blind, placebo-controlled, and investigator-initiated clinical trial. A total of 60 patients between 7 and 65 years of age with AD and respiratory disorders who received a diagnosis of AD by Hanifin and Rajka criteria who scored 15 to 50 in a scoring atopic dermatitis (SCORAD) will be enrolled. Participants will be randomly assigned to the SCRT or placebo group in a ratio of 1:1 and they will have a visit schedule comprising 4 visits including a screening visit during 8 to 10 weeks. The participants will be administered SCRT or placebo 3 times a day for 4 weeks. The primary outcome will be measured by a change of the SCORAD index. The secondary outcomes will be measured by changes in the dose and frequency of usage of the AD ointment, dermatology life quality index scores, pruritus and sleep disorder in visual analog scale, skin moisture content, skin surface temperature, Hamilton anxiety rating scale scores, depression rating scale scores, stress/autonomic nervous function test, and attention deficit hyperactivity disorder survey scores at week 4 as compared to those at the baseline.
DISCUSSION: To the best of our knowledge, SCRT has rarely been reported for dermatologic diseases. This will be the first clinical trial to assess the efficacy and safety of SCRT in patients with AD and respiratory disorders. We hope that the results of this trial will provide evidence for the use of SCRT as a new treatment for AD with respiratory disorders.

TRIAL REGISTRATION: Korean National Clinical Trial Registry, Clinical Research Information Service. (KCT0004148) (https://cris.nih.go.kr/cris/search/search_result_st01_en.jsp?seq=14981&ltype=&rt ype=)

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NeuroImage. 2019 Mar;188:642-53.

COMPARING DIRECTED FUNCTIONAL CONNECTIVITY BETWEEN GROUPS WITH CONFIRMATORY SUBGROUPING GIMME.

Henry TR, Feczko E, Cordova M, et al.

Connectivity modeling in functional neuroimaging has become widely used method of analysis for understanding functional architecture. One method for deriving directed connectivity models is Group Iterative Multiple Model Estimation (GIMME; Gates and Molenaar, 2012). GIMME looks for commonalities across the sample to detect signal from noise and arrive at edges that exist across the majority in the group ("group-level edges") and individual-level edges. In this way, GIMME obtains generalizable results via the group-level edges while also allowing for between subject heterogeneity in connectivity, moving the field closer to obtaining reliable personalized connectivity maps. In this article, we present a novel extension of GIMME, confirmatory subgrouping GIMME, which estimates subgroup-level edges for a priori known groups (e.g. typically developing controls vs. clinical group). Detecting edges that consistently exist for individuals within predefined subgroups aids in interpretation of the heterogeneity in connectivity maps and allows for subgroup-specific inferences. We describe this algorithm, as well as several methods to examine the results. We present an empirical example that finds similarities and differences in resting state functional connectivity among four groups of children: typically developing controls (TDC), children with autism spectrum disorder (ASD), children with Inattentive (ADHD-I) and Combined (ADHD-C) Type ADHD. Findings from this study suggest common involvement of the left Broca's area in all the clinical groups, as well as several unique patterns of functional connectivity specific to a given disorder. Overall, the current approach and proof of principle findings highlight a novel and reliable tool for capturing heterogeneity in complex mental health disorders

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Neuroimage Clin. 2019;22:101692.

REDUCED HIGHER DIMENSIONAL TEMPORAL DYNAMISM IN NEUROFIBROMATOSIS TYPE 1.

Mennigen E, Schuette P, Vajdi A, et al.

Neurofibromatosis type 1 (NF1) is a common single gene disorder resulting in multi-organ involvement. In addition to physical manifestations such as characteristic pigmentary changes, nerve sheath tumors, and skeletal abnormalities, NF1 is also associated with increased rates of learning disabilities, attention deficit hyperactivity disorder, and autism spectrum disorder. While there are established NF1-related structural brain anomalies, including brain overgrowth and white matter disruptions, little is known regarding patterns of functional connectivity in NF1. Here, we sought to investigate functional network connectivity (FNC) in a well-characterized sample of NF1 participants (n=30) vs. age- and sex-matched healthy controls (n=30). We conducted a comprehensive investigation of both static as well as dynamic FNC and meta-state analysis, a novel approach to examine higher-dimensional temporal dynamism of whole-brain connectivity. We found that static FNC of the cognitive control domain is altered in NF1 participants. Specifically, connectivity between anterior cognitive control areas and the cerebellum is decreased, whereas connectivity within the cognitive control domain is increased in NF1 participants relative to healthy controls. These alterations are independent of IQ. Dynamic FNC analysis revealed that NF1 participants spent more time in a state characterized by whole-brain hypoconnectivity relative to healthy controls. However, connectivity strength of dynamic states did not differ between NF1 participants and healthy controls. NF1 participants exhibited also reduced higher-dimensional dynamism of whole-brain connectivity, suggesting that temporal fluctuations of

FNC are reduced. Given that similar findings have been observed in individuals with schizophrenia, higher occurrence of hypoconnected dynamic states and reduced temporal dynamism may be more general indicators of global brain dysfunction and not specific to either disorder

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Neuroimage Clin. 2019;21:101677.

SEGREGATING SUSTAINED ATTENTION FROM RESPONSE INHIBITION IN ADHD: AN FMRI STUDY.

Hwang S, Meffert H, Parsley I, et al.

BACKGROUND: The functional significance of the impairment shown by patients with ADHD on response inhibition tasks is unclear. Dysfunctional behavioral and BOLD responses to rare no-go cues might reflect disruption of response inhibition (mediating withholding the response) or selective attention (identifying the rare cue). However, a factorial go/no-go design (involving high and low frequency go and no-go stimuli) can disentangle these possibilities.

METHODS: Eighty youths [22 female, mean age=13.70 (SD=2.21), mean IQ=104.65 (SD=13.00); 49 with diagnosed ADHD] completed the factorial go/no-go task while undergoing fMRI.

RESULTS: There was a significant response type-by-ADHD symptom severity interaction within the left anterior insula cortex; increasing ADHD symptom severity was associated with decreased recruitment of this region to no-go cues irrespective of cue frequency. There was also a significant frequency-by-ADHD symptom severity interaction within the left superior frontal gyrus. ADHD symptom severity showed a quadratic relationship with responsiveness to low frequency cues (irrespective of whether these cues were go or no-go); within this region, at lower levels of symptom severity, increasing severity was associated with increased BOLD responses but at higher levels of symptom severity, decreasing BOLD responses.

CONCLUSION: The current study reveals two separable forms of dysfunction that together probably contribute to the impairments shown by patients with ADHD on go/no-go tasks

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Neuropharmacology. 2019 May;149:66-82.

DEVELOPMENTAL NICOTINE EXPOSURE PRECIPITATES MULTIGENERATIONAL MATERNAL TRANSMISSION OF NICOTINE PREFERENCE AND ADHD-LIKE BEHAVIORAL, RHYTHMOMETRIC, NEUROPHARMACOLOGICAL, AND EPIGENETIC ANOMALIES IN ADOLESCENT MICE.

Buck JM, Sanders KN, Wageman CR, et al.

Maternal smoking during pregnancy, a form of developmental nicotine exposure (DNE), is associated with increased nicotine use and neurodevelopmental disorders such as ADHD in children. Here, we characterize the behavioral, rhythmometric, neuropharmacological, and epigenetic consequences of DNE in the F1 (first) and F2 (second) generation adolescent offspring of mice exposed to nicotine prior to and throughout breeding. We assessed the effects of passive oral methylphenidate (MPH) administration and voluntary nicotine consumption on home cage activity rhythms and activity and risk-taking behaviors in the open field. Results imply a multigenerational predisposition to nicotine consumption in DNE mice and demonstrate ADHD-like diurnal and nocturnal hyperactivity and anomalies in the rhythmicity of home cage activity that are reversibly rescued by MPH and modulated by voluntary nicotine consumption. DNE mice are hyperactive in the open field and display increased risk-taking behaviors that are normalized by MPH. Pharmacological characterization of nicotinic and dopaminergic systems in striatum and frontal cortex reveals altered expression and dysfunction of nicotinic acetylcholine receptors (nAChRs), hypersensitivity to nicotine-induced nAChR-mediated dopamine release, and impaired dopamine transporter (DAT) function in DNE mice. Global DNA methylation assays indicate DNA methylome deficits in striatum and frontal cortex of DNE mice. Collectively, our data demonstrate that DNE enhances nicotine preference, elicits hyperactivity and risk-taking behaviors, perturbs the rhythmicity of activity, alters nAChR expression and function, impairs DAT function, and causes DNA hypomethylation in striatum and frontal cortex of both first and second-generation adolescent offspring. These findings recapitulate multiple domains of ADHD symptomatology

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Neuropsychiatr Enfance Adolesc. 2020;68:29-38.

LONG TERM EFFECTS OF WORKING MEMORY TRAINING (COGMED) AMONG CHILDREN WITH ADHD.

Rivard C, Dentz A, Romo L, et al.

Background: Attention-deficit/hyperactivity disorder (ADHD) is a prevalent neurodevelopmental disorder associated with working memory deficits. In that optic, new interventions designed to train working memory have been developed. Cogmed Working Memory Training (CWMT) is a popular online training program that is said to increase working memory (WM) and related skills in the ADHD population. However, follow-up measures are not systematically included, and long-term effects of CWMT are controversial. Also, the number of studies examining transfer of learning and controlling for medication or comorbidities are limited.
Objectives: This study investigates the long-term effects of CWMT combined with psychostimulant medication on WM and related skills.
Methods: This study included 31 participants aged 7 to 13 years, diagnosed with ADHD (mixed subtype) associated with learning disorders, oppositional-defiant disorder and/or Tourette syndrome. Participants first completed CWMT and were evaluated at follow-up six months later. We used a randomized, double-blind, placebo-controlled design.
Results: The results found no significant impact of CWMT at follow-up. There were no improvements of WM nor transfer effects on related skills, academic achievement or ADHD symptoms at six months follow-up.
Conclusion: Long-term efficacy of CWMT is not demonstrated. We can't support CWMT as an effective complementary treatment for children with ADHD and associated comorbidities

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Nutrition. 2019 Jan;57:167-72.

RANDOMIZED OPEN-LABEL TRIAL OF DOCOSAHEXAENOIC ACID-ENRICHED FISH OIL AND FISH MEAL ON COGNITIVE AND BEHAVIORAL FUNCTIONING IN OMANI CHILDREN.

Al-Ghannami SS, Al-Adawi S, Ghebremeskel K, et al.

OBJECTIVE: This study aimed to examine the effect of docosahexaenoic acid (DHA)-enriched fish oil supplement and meal of grilled fish on cognitive and behavioral functioning manifested as attention-deficit/hyperactivity disorder in primary school students 9 to 10 y of age in Muscat, Oman.
METHODS: This randomized open-label trial involved two types of interventions: fish oil supplement or one serving (100 g) of grilled fish per day (Sunday through Friday) for 12 weeks. Red cell total lipid DHA levels were assessed. The Verbal Fluency Test, Buschke Selective Reminding Test, and Trail Making Test were used to measure cognitive functioning. Behavioral functioning was assessed using a standardized Arabic version of the National Initiative for Children's Health Quality Vanderbilt Assessment Scales. All measurements were carried out before and after intervention.
RESULTS: DHA levels increased by 72% and 64% in the fish oil (mean, 3.6%-6.2%) and fish-meal (mean, 3.4%-5.6%) groups, respectively (P = 0.000). The Trail Making Test was the only cognitive test that demonstrated marked differences between groups: Median interquartile range difference between pre- and postintervention in the Trail Making Part B score was 61.5 (SE, 19.3, 103.2) in the fish oil versus fish-meal group, 24.5 (SE, -15.2, 74.7, P = 0.005). The Vanderbilt Assessment Scales also showed significant differences between groups (P < 0.001).
CONCLUSION: This study contributed to available evidence on the cognitive and behavioral benefits of DHA in healthy school children. Expanding the food fortification program with DHA-enriched fish oil should be considered as part of broader policy to improve child health

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Ophthalmic Epidemiology. 2019.

ASSOCIATIONS BETWEEN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND OCULAR ABNORMALITIES IN CHILDREN: A POPULATION-BASED STUDY.

Ho J-D, Sheu J-J, Kao Y-W, et al.

Purpose: Attention-deficit/hyperactivity disorder (ADHD) was reported to be associated with disturbances in the prefrontal circuitry and seems to be associated with dysfunctions of eye motility. This study aimed to

explore associations between ADHD and ocular abnormalities, including amblyopia, hypermetropia, astigmatism, and heterotropia, using a large, nationwide population-based dataset in Taiwan.
Methods: We retrieved our sample for this cross-sectional study from the Taiwan National Health Insurance Research Database. In total, 116,308 children with ADHD were selected as the study group and 116,308 randomly selected children without ADHD as the comparison group. We used conditional logistic regression analyses to examine the odds ratios (ORs) of amblyopia, hypermetropia, astigmatism, and heterotropia between children with and those without ADHD.
Results: We found that children with ADHD had significantly higher prevalences of amblyopia (1.6% vs. 0.9%, p<.001), hypermetropia (2.4% vs. 1.3%, p <.001), astigmatism (0.2% vs. 0.1%, p <.001), and heterotropia (1.1% vs. 0.5%, p <.001) than children without ADHD. The ORs of amblyopia, hypermetropia, astigmatism and heterotropia for children with ADHD were 1.89 (95% confidence interval (CI) = 1.76 ~ 2.05), 1.82 (95% CI = 1.68 ~ 1.92), 1.73 (95% CI = 1.34 ~ 2.16), and 2.01 (95% CI = 1.82 ~ 2.21) compared to children without ADHD.
Conclusions: The findings suggest that ADHD is associated with ocular abnormalities, including amblyopia, hypermetropia, astigmatism, and heterotropia

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Pediatrics. 2019 Oct;144.
PREVALENCE AND TRENDS OF DEVELOPMENTAL DISABILITIES AMONG CHILDREN IN THE UNITED STATES: 2009-2017.
Zablotsky B, Black LI, Maenner MJ, et al.
OBJECTIVES: To study the national prevalence of 10 developmental disabilities in US children aged 3 to 17 years and explore changes over time by associated demographic and socioeconomic characteristics, using the National Health Interview Survey.
METHODS: Data come from the 2009 to 2017 National Health Interview Survey, a nationally representative survey of the civilian noninstitutionalized population. Parents reported physician or other health care professional diagnoses of attention-deficit/hyperactivity disorder; autism spectrum disorder; blindness; cerebral palsy; moderate to profound hearing loss; learning disability; intellectual disability; seizures; stuttering or stammering; and other developmental delays. Weighted percentages for each of the selected developmental disabilities and any developmental disability were calculated and stratified by demographic and socioeconomic characteristics.
RESULTS: From 2009 to 2011 and 2015 to 2017, there were overall significant increases in the prevalence of any developmental disability (16.2%-17.8%, P < .001), attention-deficit/hyperactivity disorder (8.5%-9.5%, P < .01), autism spectrum disorder (1.1%-2.5%, P < .001), and intellectual disability (0.9%-1.2%, P < .05), but a significant decrease for any other developmental delay (4.7%-4.1%, P < .05). The prevalence of any developmental disability increased among boys, older children, non-Hispanic white and Hispanic children, children with private insurance only, children with birth weight >/=2500 g, and children living in urban areas and with less-educated mothers.
CONCLUSIONS: The prevalence of developmental disability among US children aged 3 to 17 years increased between 2009 and 2017. Changes by demographic and socioeconomic subgroups may be related to improvements in awareness and access to health care

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Pediatrics. 2019;144.
EFFECTS OF THERAPY PUTTY USAGE ON ACADEMIC PERFORMANCE AND PERCEIVED ATTENTION TO TASK IN STUDENTS WITH ADHD.
Shah J, Milanaik R, Das P, et al.
Background: Therapy putty (TP) has been promoted as an effective self-regulation tool for children with attention-deficit/hyperactivity disorder (ADHD). Putty manufacturers claim that manipulating TP provides ?heavy sensory input? allowing ADHD children to take focus off sensory needs and onto tasks at hand. To

date, however, no studies have examined the validity of these claims pertaining to the efficacy of TP on student academic performance.
Objective: To assess the impact of TP usage on task completion and accuracy of students with/without ADHD, and examine student perceptions regarding the effect of TP on focus and performance estimates. Design/Methods: Students (n=81) aged 8-18 years (43 with ADHD [AS], 38 without ADHD [CS]) completed a 3-minute timed modified Permanent Product Measure of Performance (mPERMP), a skill-adjusted math test, and a Forward Digit Span Test (FDST), a listening test measuring recall ability, with/without TP. Parents reported demographics and rated their child's academic performance. Subjects were randomized into 2 cohorts, which differed in the order of the tasks completed. Following successful completion of each task, subjects evaluated their focus and performance on a 10-point Likert Scale. A paired ttest was used to analyze the effects of TP.
Results: Of the 81 subjects, 70% identified as male; 52% White, 28% Asian, 10% Black, and 10% other; 90% Non-Hispanic/Latino. Mean age of AS was 11.7 years (SD: 2.5); mean age of CS was 10.8 years (SD: 2.3). 62% of parents believed their children were academically performing in the ?average? range. Table 1 depicts performance on the mPERMP and FDST with/without TP usage. Table 2 shows participants' mean focus and performance scores for both tests with/without TP usage. All p-values correspond to a 95% confidence interval.
Conclusions: For all subjects, TP usage was significantly associated with lower mPERMP completion and accuracy scores as well as lower mean perceived focus and performance ratings. While students with ADHD showed significant FDST accuracy score improvement with TP, there was no significant impact on mean perceived FDST focus or performance ratings. Our study suggests that ADHD students may benefit from TP usage with listening tasks only although more research is needed to support this finding. All therapies that are intended for classroom use by ADHD students should be thoroughly studied prior to implementation as these intended therapy tools may actually pose a distraction to students and lead to lower academic success

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Pediatrics. 2019 Oct;144.
ADHD DIAGNOSIS AND TREATMENT GUIDELINES: A HISTORICAL PERSPECTIVE.
Wolraich ML, Chan E, Froehlich T, et al.
Attention-deficit/hyperactivity disorder (ADHD) is the most common behavioral condition and the second most common chronic illness in children. The observance of specific behaviors in multiple settings have remained the most successful method for diagnosing the condition, and although there are differences in specific areas of the brain, and a high heritability estimate (approximately 76%), they are not diagnostically specific. Medications, and particularly stimulant medication, have undergone rigorous studies to document their efficacy dating back to the 1970s. Likewise, behavioral interventions in the form of parent training and classroom programs have demonstrated robust efficacy during the same time period. Both medication and behavioral interventions are symptomatic treatments. The availability of only symptomatic treatments places ADHD in the same category as other chronic conditions such as diabetes and asthma. Successful treatment of most individuals requires ongoing adherence to the therapy. Improved communication between patients and their families, primary and mental health providers, and school personnel is necessary for effective ADHD treatment. Further enhancement of electronic systems to facilitate family, school, and provider communication can improve monitoring of ADHD symptoms and functional performance. The American Academy of Pediatrics ADHD guidelines were initially developed to help primary care clinicians address the needs of their patients with ADHD and were further refined with the second revision in 2019

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Pediatrics. 2019 Oct;144.

CLINICAL PRACTICE GUIDELINE FOR THE DIAGNOSIS, EVALUATION, AND TREATMENT OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN CHILDREN AND ADOLESCENTS.

Wolraich ML, Hagan JF, Jr., Allan C, et al.

Attention-deficit/hyperactivity disorder (ADHD) is 1 of the most common neurobehavioral disorders of childhood and can profoundly affect children's academic achievement, well-being, and social interactions. The American Academy of Pediatrics first published clinical recommendations for evaluation and diagnosis of pediatric ADHD in 2000; recommendations for treatment followed in 2001. The guidelines were revised in 2011 and published with an accompanying process of care algorithm (PoCA) providing discrete and manageable steps by which clinicians could fulfill the clinical guideline's recommendations. Since the release of the 2011 guideline, the Diagnostic and Statistical Manual of Mental Disorders has been revised to the fifth edition, and new ADHD-related research has been published. These publications do not support dramatic changes to the previous recommendations. Therefore, only incremental updates have been made in this guideline revision, including the addition of a key action statement related to diagnosis and treatment of comorbid conditions in children and adolescents with ADHD. The accompanying process of care algorithm has also been updated to assist in implementing the guideline recommendations. Throughout the process of revising the guideline and algorithm, numerous systemic barriers were identified that restrict and/or hamper pediatric clinicians' ability to adopt their recommendations. Therefore, the subcommittee created a companion article (available in the Supplemental Information) on systemic barriers to the care of children and adolescents with ADHD, which identifies the major systemic-level barriers and presents recommendations to address those barriers; in this article, we support the recommendations of the clinical practice guideline and accompanying process of care algorithm

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Pediatrics. 2019;144.

IMPROVING ACCESS FOR MENTAL HEALTH IN PRIMARY CARE USING VIRTUAL TECHNOLOGY (A QUALITY IMPROVMENT PROJECT FOR ADHD).

Isakov DG, Cairns CL.

Background: Attention-deficit/hyperactivity disorder is one of the most common chronic conditions in childhood. It is estimated that the prevalence of ADHD in school age children in the U S is 12%. ADHD is the most frequent mental health disorder that is seen in the pediatric primary care office. The economic cost of ADHD is very high in the United States. In 2000 the estimated cost of ADHD was $31.6 billion. This figure does not include the economic impact of lost work for families of children diagnosed with ADHD. By 2010 the cost was reported to be between 143-266 billion, including the impact of lost wages and production. ADHD visits in the primary care setting may be challenging due to limited access, and challenges to coordinate around school and work schedules. Our primary care practice comprises over 100 pediatric providers and ...pediatric patients. In order to meet the AAP guidelines for ADHD in which patients should be followed up within a month of starting medication, standardize the care of ADHD within the department and improve access we piloted virtual visit for ADHD in the primary care office setting.

Methods: A small team of providers reviewed the process and it was determined that utilizing technology for virtual visits could be the stepping stone to providing follow up ADHD visits in addition to standardizing the care for ADHD within the department. Providers were recruited for the pilot by surveying all of our providers and determining who would be interested in participating. Seven providers including agreed to participate in the pilot. Workfiows were designed, EMR templates were created, equipment was provided and providers were trained on virtual visits. Satisfaction surveys were created for both parent and provider.

Conclusion: Six providers completed 30 follow up ADHD visits over a period of 6 months: February 2017-October 2017. Although this was a small sample size, PDSA cycles were completed each month to improve the process and overcome any barriers. The satisfaction survey results from both provider and parents were positive. Successes included decrease in phone calls and messaging, children enjoyed it, ability to visualize the child's environment, including other family members, convenience, relationship building, quick timely visit. Areas of opportunity include scheduling Check in /Check out process, training, technical support, patient selection (standardized) and reimbursement. Next Steps: Based on our pilot the organization is disseminating virtual visits to all pediatric primary care providers. All pediatric providers are being trained. The initial visits

will be for our own employee health plan patients with a diagnosis of ADHD. The workflow developed for the pilot is being implemented throughout the pediatric primary care department. Moving forward the goal is to include other mental health diagnosis including depression and anxiety

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PLoS ONE. 2019;14:e0215085.

CHILDHOOD ADVERSITY, MENTAL HEALTH, AND OXIDATIVE STRESS: A PILOT STUDY.

Horn SR, Leve LD, Levitt P, et al.

Childhood adversity is a potent risk factor for mental health conditions via disruptions to stress response systems. Dysregulations in oxidative stress systems have been associated with both childhood adversity and several psychological disorders (e.g., major depressive disorder) in adult populations. However, few studies have examined associations between childhood adversity, oxidative stress, and mental health in pediatric populations. Childhood adversity (Adverse Childhood Events [ACE]), oxidative stress [F2t-isoprostanes (IsoPs)], and mental health pathology were assessed in 50 adolescent females recruited primarily through the Department of Youth Services. Standard ordinary least squares regression models were run co-varying for age, race/ethnicity, adolescent nicotine use, study condition, and parent history of ACEs. Adolescents who reported experiencing four or more ACEs had significantly elevated IsoP levels. Further, internalizing symptom scores across diagnoses were significantly associated with elevated IsoPs, whereas no externalizing symptoms scores, except Attention Deficit Hyperactivity Disorder, were related to altered oxidative stress. Results indicate that IsoPs may be a global marker of childhood adversity and mental health symptomatology, particularly within internalizing symptom domains. A limitation is that body mass index was not collected for this sample. Future studies are needed to replicate and extend these findings in larger, more diverse samples

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Prax Kinderpsychol Kinderpsychiatr. 2020 Jan;69:40-59.

ATTACHMENT REPRESENTATIONS, CRITICAL LIFE EVENTS AND ADHD IN BOYS AT 6 TO 10 YEARS OF AGE.

Rampp G, Roesler C, Peter J.

Attachment Representations, Critical Life Events and ADHD in Boys at 6 to 10 Years of Age The importance of the attachment theory was repeatedly pointed out in the literature for understanding children with attention deficit hyperactivity disorder (ADHD) with regard to their emotional state. Symptoms of ADHD, like attention deficits, motor agitation and impulsivity are seen as risk factors for insecure attachment in the parent-child relationship. The acquisition of attachment representations in children with ADHD might help to describe - and individual classify - the syndromes of this behavioural disorder better. The aims of the present study are, therefore, the investigation of attachment representations and critical life events in boys with ADHD. We focused on boys only, since they are particularly prone to develop ADHD. Using the story-completion technique, we investigated whether boys with ADHD showed insecure attachment more frequently compared to boys without ADHD. 31 boys with ADHD at six to ten years of age were recruited in two different clinics. Of these, 29 % showed a secure and 71 % showed an insecure attachment representation. Within insecure attachment, the ambivalent attachment representation occurred most frequently (41 %). On average, we found 2.3 critical life events. The enhanced frequency of the ambivalent attachment representation indicates that ADHD might be linked to externalizing behaviour. The results support the hypothesis that ADHD is increasingly associated with insecure attachment. The binding theory is able to contribute to a better understanding of the emotional state in boys with ADHD

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Prim Care Companion CNS Disord. 2019 Jul;21.

NOVEL INTERACTIVE EYE-TRACKING GAME FOR TRAINING ATTENTION IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Garcia-Baos A, D'Amelio T, Oliveira I, et al.

Objective: To assess whether the eye-tracking approach of the RECOGNeyes game has potential therapeutic benefits for children with neurodevelopmental disorders, in particular attention-deficit/hyperactivity disorder (ADHD). RECOGNeyes is a computer game that is played using the eyes as the game controller. The rationale behind the game is that individuals with ADHD have an underdeveloped attention control system. This attention control system is underdeveloped not because they lack this capacity but because this ability has not been sufficiently developed. The game was designed as an intervention for training visual attention in ADHD.

Methods: The sample included 28 children aged 8-15 years (18 aged < 12 y and 10 aged >/= 12 y) previously diagnosed with ADHD (DSM-5 criteria). The participants were randomly divided into 2 groups. The experimental group played RECOGNeyes with eye-tracker for 3 weeks (3 times/week) at home, while the control group played the game using the mouse. Different attentional parameters were assessed before and after training. The study was conducted from January 2018-June 2018.

Results: Participants from the eye-tracker group showed an improvement posttest compared to pretest in impulsivity (P = .0067), reaction time (P < .0001), and fixation gaze control (P < .0001). No changes were found in mouse control between pretest and posttest assessments.

Conclusion: RECOGNeyes is a child-friendly, interactive game combined with eye-tracking technology that seems to provide an improvement in the visual attention system, which is especially indicated for ADHD patients. This game might be used as an alternative to pharmacologic therapy and may provide new insights into the treatment of ADHD.

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Proc Natl Acad Sci U S A. 2020;117:641-49.

EARLY CHILDHOOD DEPRIVATION IS ASSOCIATED WITH ALTERATIONS IN ADULT BRAIN STRUCTURE DESPITE SUBSEQUENT ENVIRONMENTAL ENRICHMENT.

Mackes NK, Golm D, Sarkar S, et al.

Early childhood deprivation is associated with higher rates of neurodevelopmental and mental disorders in adulthood. The impact of childhood deprivation on the adult brain and the extent to which structural changes underpin these effects are currently unknown. To investigate these questions, we utilized MRI data collected from young adults who were exposed to severe deprivation in early childhood in the Romanian orphanages of the Ceau+*ƒ*escu era and then, subsequently adopted by UK families; 67 Romanian adoptees (with between 3 and 41 mo of deprivation) were compared with 21 nondeprived UK adoptees. Romanian adoptees had substantially smaller total brain volumes (TBVs) than nondeprived adoptees (8.6% reduction), and TBV was strongly negatively associated with deprivation duration. This effect persisted after covarying for potential environmental and genetic confounds. In whole-brain analyses, deprived adoptees showed lower right inferior frontal surface area and volume but greater right inferior temporal lobe thickness, surface area, and volume than the nondeprived adoptees. Right medial prefrontal volume and surface area were positively associated with deprivation duration. No deprivation-related effects were observed in limbic regions. Global reductions in TBV statistically mediated the observed relationship between institutionalization and both lower intelligence quotient (IQ) and higher levels of attention deficit/hyperactivity disorder symptoms. The deprivation-related increase in right inferior temporal volume seemed to be compensatory, as it was associated with lower levels of attention deficit/hyperactivity disorder symptoms. We provide compelling evidence that time-limited severe deprivation in the first years of life is related to alterations in adult brain structure, despite extended enrichment in adoptive homes in the intervening years

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Proceedings of the Nutrition Society. 2020;79.
IRON STATUS OF CHILDREN WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER: A SYSTEMATIC REVIEW.
Degremont A, Jain R, Philippou E, et al.

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Psychiatr Hung. 2020;35:30-36.
DESCRIPTION OF PERINATAL ADVERSITIES IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.
Banhegyi M, Hargitai E, Mikics E, et al.
BACKGROUND: Attention-deficit/hyperactivity disorder (ADHD) is the most common neurodevelopmental disorder. According to literature data, perinatal adversities might be associated with the occurrence of ADHD, but the results are inconclusive at the moment. The aim of the present study is to describe perinatal adversities in children with ADHD.
METHODS: The data of children in County Fejer Pedagogical Service in three consecutive school years (2012-2015) was analyzed. In the present sample, 219 children with special education needs were diagnosed with ADHD (age: 9.0 years, SD: 3.1 years; 36 girls). The diagnosis was based on ICD-10 criteria. The present analysis is restricted to the presence of preterm birth, complicated/prolonged labor, intrauterine hypoxia and birth asphyxia in children with ADHD from different areas (central, urban or rural) of the county. Logistic regression analysis was performed to assess the effects of gender, age was used as a covariate.
RESULTS: Within this sample, the presence of complicated/prolonged labor was significantly lower (OR: 0.378, p<0.039) in girls compared to boys. The other studied variables did not show significant differences regarding gender. Intrauterine hypoxia was registered in 28 cases, while birth asphyxia was registered in 15 cases. The presence of preterm birth was 8.7%, and showed distinctive differences according to living area (central: 3.6% vs rural: 11.3%).
CONCLUSIONS: Our results indicate the importance of registering perinatal complications and long term follow up of these children in the direction of neurodevelopmental disorders, however a limitation of the present study is the lack of a control group

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Psychiatr Hung. 2020;35:58-67.
LONG-TERM FOLLOW-UP OF CHILDHOOD-ONSET DEPRESSION - COMORBIDITY, SUICIDAL BEHAVIOR AND PROGNOSIS IN ADULTHOOD.
Kiss E, Baji I, Kellner A, et al.
INTRODUCTION: Several long-term follow-up studies investigate the progression of adolescent onset major depressive disorder but much less explore short and long-term consequences and prognosis into adulthood of childhood- onset depression. The aim of the present study is to follow childhood-onset depression, lifetime comorbid psychiatric disorders and suicidal behavior into adulthood.
METHODS: Subjects (N=166) were 25.95+2.42 years old on average, 54.2% were women. Follow-up period lasted for a mean of 14.74+1.31 years. Psychiatric diagnosis was assessed by a DSM-IV based semi-structured interview. Subjects reported on 4 stages of suicidal behavior as one of the symptoms of depressive disorder.
RESULTS: The onset of the first depressive episode was at the mean age of 10.17+2.34 years. 40,4% of the sample had only 1 episode while recurrent depressive episode presented in 32.5% above 18 years of age. Lifetime comorbid psychiatric disorders were present in more than 1/3 of the sample. The most frequent lifetime comorbidity was anxiety (42.4%), and specific phobia among anxiety disorders. Lifetime attention deficit-hyperactivity disorder and oppositional/conduct disorder were also frequent (25.9% and 16.9%, respectively). Suicidal behavior was not present life-time in 19.1% of the sample. Thoughts of death and thoughts of suicide were quite frequent (80.8% and 69.5%, respectively), specific plans and suicidal attempt were more frequent in girls (plan:female vs male 53.9% vs 38.4%, attempt: 33.3% vs 9.6%) during follow-up.
CONCLUSION: About one-third of childhood-onset depression had recurrence above 18 years of age, which is lower than the recurrence rate for adolescent onset depression. A high rate of lifetime comorbidity was

found between depression and anxiety disorders. The assessment of the actual level of suicidal behavior is important in the prevention of selfdestructive behavior

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Psychiatr Hung. 2020;35:37-45.

CLINICAL CHARACTERISTICS OF CHILDREN WITH TOURETTE'S SYNDROME.

Nagy P, Bognar E, Farkas L, et al.

INTRODUCTION: Tourette Syndrome (TS) is a neurodevelopmental disorder presenting with motor and vocal tics. Although TS influences the everyday life of children, we only have fragmented knowledge on the topic of the developmental and comorbidity profile, symptom severity and genetical/environmental background. The aim of this article is to present the demographical characteristics, comorbidity profile and the tic symptom types and severity of patients from the Tourette Syndrome Outpatient Clinic of Vadaskert Child and Adolescent Psychiatry Hospital, Budapest.

METHODS: Our sample consists of all the patients (N=137), who visited the Tourette Syndrome Outpatient Clinic between February, 2012, and July, 2013. Patients were in the age range of 3 to 18 years. We recorded demographical and tic-specific data (age, symptom onset, TS in the family, comorbidity, adverse pre-/peri-/postnatal events) of the participants, and administered the Yale Global Tic Severity Scale (YGTSS).

RESULTS: The average age at symptom onset was 5.9 years. Average symptom severity (measured by the YGTSS) was 22.4 points. Comorbid Attention Deficit and Hyperactivity Disorder (ADHD) was reported in 31%, Obsessive-Compulsive Disorder (OCD) in 10%, and Autism Spectrum Disorders (ASD) in 10% of the sample. The most common tic types were simple head tics (blinking, shaking of head). Symptom severity correlated positively with age ($p < 0.05$), but not with gender, age at symptom onset, positive family history for TS, or adverse pre-, peri-, and postnatal events.

CONCLUSION: The characteristics of our sample does not show any major differences from international reports of similar samples. Comorbidity is an exception: our sample shows lower rates of comorbidities than usually reported

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Psychiatry and Clinical Psychopharmacology. 2019;29:502-08.

RELATIONSHIPS BETWEEN TEACHER-REPORTED ADHD SYMPTOM PROFILES AND ACADEMIC ACHIEVEMENT DOMAINS IN A NONREFERRED CONVENIENCE SAMPLE OF FIRST- TO FOURTH-GRADE STUDENTS.

Mûner O, Vatanartiran S, Karadeniz P.

OBJECTIVES: Previous studies suggested that inattention was related particularly with reading problems among students. However, most of the former studies had clinically referred samples. A majority of the studies conducted with nonreferred samples have evaluated academic achievement with single or a few parent- or teacher-rated items. Almost none of the studies have investigated reading, writing, and mathematics achievements in a single sample. Data from low- and middle-income countries on the subject are exceedingly scarce. Objectives of the present study were to compare actual measurements of reading fluency, reading comprehension, reading and writing errors, mathematics achievement, and teacher ratings of attention deficit hyperactivity disorder (ADHD) symptoms in a single sample.

METHODS: Teachers rated ADHD symptoms in a single, nonreferred, population sample (n = 2493) of first- to fourth-grade students with a SNAP-4 rating scale. Actual measurements of reading fluency, reading comprehension, reading and writing errors, and mathematics achievement were also obtained. Fluid IQ was evaluated with Ravens Progressive Matrices. Students were grouped into Predominantly Inattentive (PI), Hyperactive/Impulsive (HI), Combined (C), or control groups. Univariate and multivariate analyses were conducted. Statistical significance was set at $p < .003$ after correction for multiple comparisons.

RESULTS: We showed that after fluid IQ level and gender were controlled, ADHD-PI and ADHD-C groups (but not ADHD-HI) had significantly lower performance in all academic areas. ADHD-PI increased the risk of being in the lowest performing 10th percentile for reading 3 times, for writing more than 3.9 times, and for mathematics more than 6 times.

CONCLUSIONS: We investigated the subtype differences in terms of academic achievement between ADHD-PI, ADHD-HI, and ADHD-C, based on teacher reports. Academic achivement data were not based on teacher or parent reports but on the actual performance of the students using standardized tests. Our results suggested that inattention symptoms must be targeted in primary school students in order to help them have academic achievement similar to their peers

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Psychiatry Res. 2019 May;275:315-25.

DISTINGUISHING PRODROMAL STAGE OF BIPOLAR DISORDER AND EARLY ONSET SCHIZOPHRENIA SPECTRUM DISORDERS DURING ADOLESCENCE.

Kafali HY, Bildik T, Bora E, et al.

Prodromal symptoms of bipolar disorder (BD) and early onset schizophrenia spectrum disorder (EOSSD) overlap. To date, there has been no study directly comparing the prodromal stage of both disorders. Thus, the current study is aimed at determining which prodromal symptom clusters differentiate BD and EOSSD. One hundred twenty one adolescents (33 BD-1, 30 EOSSD, 58 healthy controls) were evaluated for the presence of 79 prodromal symptoms, divided into 7 prodromal symptom clusters. Great than 2 subsyndromal manic symptoms and ADHD comorbidity were significantly more specific for BD than schizophrenia; brief limited intermittent psychotic symptoms (BLIPS) were more likely to be part of EOSSD. In contrast, attenuated psychotic symptoms, and negative symptoms were not specifically related to the diagnosis of EOSSD. In conclusion, subsyndromal manic symptoms, BLIPS, and ADHD might be useful for predicting the trajectory of an emerging affective disorder versus schizophrenia and thus valuable for early detection, and intervention strategies

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Psychiatry Res. 2020;284.

FUNCTIONAL CONNECTIVITY OF SPECIFIC BRAIN NETWORKS RELATED TO SOCIAL AND COMMUNICATION DYSFUNCTION IN ADOLESCENTS WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER.

Chen M-H, Chen Y-L, Bai Y-M, et al.

Background: Adolescents with attention-deficit hyperactivity disorder (ADHD) may have impaired social cognition and communication. However, the functioning of the brain networks involved in the social cognition and communication impairment in ADHD patients remains unclear.

Methods: In total, 18 adolescents with ADHD and 16 age- and sex-matched typically developing adolescents (controls)ΓÇöall of whom underwent a brain magnetic resonance imaging examinationΓÇöwere enrolled. Their parents filled out Swanson, Nolan, and Pelham IV (SNAP-IV) and Social Responsiveness Scale (SRS) questionnaires. Functional connectivity analyses based on the default mode network, frontoparietal network, and cinguloopercular network were performed.

Results: Compared with controls, adolescents with ADHD exhibited higher total and subscale scores on SNAP-IV and SRS. Higher SNAP-IV and SRS scores were associated with higher functional connectivity between the default mode network (ventromedial prefrontal cortex) and cinguloopercular network (anterior insula) and between the FPN (dorsolateral and prefrontal cortex) and cinguloopercular network, but with lower functional connectivity between the default mode network (posterior cingulate cortex) and frontoparietal network (inferior parietal lobule) and between the default mode network (precuneus) and cinguloopercular network (temporoparietal junction).

Discussion: Social cognition and communication impairment and ADHD may commonly share the aberrant functional connectivity in the default mode network, frontoparietal network, and cinguloopercular network

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Quality of Life Research. 2020.

INFLUENCE OF EXECUTIVE FUNCTIONS ON THE SELF-REPORTED HEALTH-RELATED QUALITY OF LIFE OF CHILDREN WITH ADHD.

Schwarer MC, Reinelt T, Petermann F, et al.

Purpose: ADHD is regarded as a neurodevelopmental disorder associated with deficits in executive functions (EF). The presence of these deficits is associated with increased symptom severity. However, so far there is little knowledge, whether deficits in EFs relate to a reduced health-related quality of life (HRQoL) in children with ADHD.

Methods: Hence, n = 100 children with a confirmed ADHD diagnosis were compared with a non-cases group (n = 100) with regard to their HRQoL (6-12-áyears old). The clinical group was divided into ADHD-specific drug treatment intake (drug treatment: n = 42; no drug treatment: n = 58) or deficits in EF (n = 29; no deficits in EF: n = 71).

Results: Children with ADHD (without medication) reported a significantly worse HRQoL than healthy children (d =.72), when controlled for age and sex. Even if they were treated with drug treatment, they reported a lower HRQoL than the non-case group in the area Family (d =.53). Drug treatment of ADHD leads to a significant difference in HRQoL in school area-á(d =.39). Children with ADHD and-áEF problems reported impairments in the social context of HRQoL compared to healthy children (d =.51 to.70). In addition, a significant negative association between set-shifting and HRQoL in children with ADHD (without drug treatment) was demonstrated (r = .27 to r = .35).

Conclusions: By assessing the HRQoL, an impairment in the functioning of children with ADHD can be detected, which is essential for the diagnosis. Furthermore, executive problems have an influence on the social sphere, which should be clarified and improved in therapy with the involvement of parents

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Res Dev Disabil. 2020;98.

A SYSTEMATIC REVIEW OF COPING STRATEGIES IN PARENTS OF CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD).

Craig F, Savino R, Fanizza I, et al.

Background: Parents of children with attention deficit hyperactivity disorder (ADHD) use several coping strategies to deal with ADHD symptoms impacting family life.

Aim: The aim of this systematic review was to summarize the coping strategies used by parents of children with ADHD, identify which tools are most frequently used to measure coping strategies, and examine factors influencing parental coping.

Method: According to PRISMA guidelines, we searched for articles indexed in PubMed, EBSCOhost, Scopus, and Web of Science using a combination of expressions including coping AND ADHD OR attention-deficit/hyperactivity disorder AND parent OR parenting OR caregiver.

Results: Fourteen empirical studies were identified as relevant to our research. Many different types of tools are used to assess coping strategies. We found that parents of ADHD children used more avoidant-focused coping strategies than parents of typical children. Mothers of ADHD children sought significantly more support and used more indirect means than mothers of typically developing (TD) children.

Conclusions: This review underlines the importance of further exploring coping mechanisms of parents of children with ADHD in order to promote positive coping strategies for parents of children with ADHD, and to help such parents to identify people who can support them

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Rev Neurol. 2018;66:S33-S36.

CHILDHOOD HEADACHES: NEW CONCEPTS AND RECENT ADVANCES.

Rufo-Campos M, Rufo-Mu+¦oz M.

This study reports on the latest advances in childhood headaches that have been made in the last few years, with special emphasis on the important new modifications that have been produced with respect to the previous ones, published in the beta version of the third edition of the International Classification of Headache

Disorders. These include headaches that have undergone important qualifications, the appearance of new entities and a section which reports the existence of new headaches, but which have still not been considered as new entities. Additionally, other points that are highlighted include the strong relation between childhood headaches and attention deficit hyperactivity disorder, the weak relation between glutamate intake and the appearance of headaches, and the scant usefulness of magnetic resonance imaging of the brain in the diagnosis of these processes. Moreover, the new modification produced in childhood episodic syndromes is highlighted

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Science and Sports. 2020.

EFFECT OF HIGH-INTENSITY INTERVAL TRAINING ON CLINICAL AND LABORATORY PARAMETERS OF ADOLESCENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Soori R, Goodarzvand F, Akbarnejad A, et al.

Purpose: The aim of the present study was to evaluate the effect of high intensity interval training (HIIT) on clinical, as assessed by the Conners Parent Rating Scale (CPRS), and anthropometric measures, and laboratory parameters of adolescents with attention deficit hyperactivity disorder (ADHD).

Methods: Forty-three adolescents with ADHD diagnosis were randomly assigned into two groups: Intervention group (male/female, n = 9/17) and Control group (male/female, n = 11/6). Intervention group performed 20 m running program repetitions with 20-30 s resting between intervals at 85% max heart rate for 6 weeks. Anthropometric and body composition measures (body mass index-Z-score; BMI-Z-score, body fat mass; BFM), Interleukin-13 (IL-13), Interleukin-16 (IL-16), lactate, and CPRS were evaluated at baseline and after 6 weeks. Data were analyzed by means of Kolmogorov-Smirnov test, two-way ANOVA, and Tukey HSD post-hoc test. The statistical significance was set at $P < 0.05$.

Results: After 6 weeks, BMI-Z-score and BFM reduced significantly in the intervention group ($P < 0.001$ and $P = 0.019$, respectively) and were significantly lower than control group ($P < 0.001$ and $P < 0.001$, respectively). After 6 weeks, lactate increased significantly in the intervention group ($P = 0.017$) and was significantly higher than control group ($P < 0.01$). IL-13 and CPRS reduced significantly after 6 weeks HIIT ($P = 0.017$ and $P = 0.04$, respectively). IL-16 did not show any significant difference between groups ($P > 0.05$).

Conclusion: HIIT seems to exert beneficial effects for adolescents with ADHD

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Technology and Disability. 2019;31:S159-S160.

THE IMPACT OF USING LEARNING APPS ON EXECUTIVE FUNCTIONS: TASK INITIATION AND PERSISTENCE OF STUDENTS WITH ATTENTION AND LEARNING DISORDER.

Shrieber B.

Background: The presentation will describe seven studies that have been examining the impact of using learning apps: iPad apps and learning software, to enhance executive functions: task initiation and persistence among students with ADHD (Attention Deficit Hyperactive Disorder), SLD (Specific Learning Disorders), and challenging behavior students, characterized with difficulties in emotional regulation. Initiation and completion of academic tasks pose the most common difficulties for pupils with learning difficulties. Task initiation is defined as the ability to independently begin a task when someone wants or is instructed to do so (Anderson, 2002; Gioia, Isquith, & Guy, 2015). Task persistence or sustained attention refers to continuous performance of a task without distraction in order to complete the task (Barkely, 1997). Difficulties in sustaining working memory have a negative impact on one's ability to remain attentive and focused for appropriate lengths of time (Isquith, Gioia, Guy, Kenworthy & Staff, 2008).

Method: Seven single-subject research design were used for this study. An ABAB design, with a withdrawal between Phase B1 and Phase A2, was implemented (Cooper, Heron, & Hewar, 2007; Kennedy, 2005). Subjects span a range of backgrounds, including age, school, and different learning disorders: ADHD, challenging behavior students and students with SLD. Each individual is separately exposed to a series of lessons under controlled conditions (baseline) and a series of lessons under experimental conditions

(intervention). The data provide a framework for describing the changes in the use of single-subject designs for each student. Phase A was used to establish a baseline and to monitor the use of traditional materials, while during the intervention phase (B), teachers used a portable computer or iPad with learning apps, including camera and dynamic interactive games.
Key results: The graphed data indicated a clear difference between Phases A and B across all participants and across all variables. The means showed similarities within phases and a clear difference between Phases A and B. The visual examination results suggest a decrease average of time response to the assignments (Task initiation) along with reducing the average number of breaks during the intervention phase (task persistence), when use a laptop or iPad with learning apps. Also, the changes in levels for all studies occurred immediately after the change in phases. Phase B2 level show stability in the graph variation and/or data reduce, for all participants.
Conclusion: Children with ADHD, SLD, and challenging behavior, have hard time to initiate tasks and keep attention persistence during learning assignments. The study indicates that using learning apps allows these students to engage their assignments and extends the duration of attention throughout the task. Using learning apps along with assistive technology, helps raise children interest in learning, provides instant feedback, and increases the students' accessibility (as with reading software) to challenging material. When students succeed to accomplish tasks as a result of their hard work, they feel empowered as they recognize that their persistence will lead to improved academic performance (Meltzer, Dunstan-Brewer & Kr-ishnan, 2018)

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Technology and Disability. 2019;31:S156-S157.

THE CONTRIBUTION OF IMOVIE EDITING TO IMPROVE STORYTELLING SKILLS OF A STUDENT WITH DEAFNESS AND ADHD.

Provisor A, Shrieber B.

Background: This case study examined the contribution of video modeling and processing it, via iMovie editing, to promote planning and organizational skills in storytelling, of a student with deafness with Attention Deficit Hyperactive Disorder (ADHD), while describing his own personal experience in Sign Language. Deaf and Hard of Hearing (DHH) students with ADHD show lower test scores in assignments that require maximum utilization of executive skills, for example telling a personal story (Cannizzaro & Coelho, 2013). In the past few years, researchers have been increasingly interested in the ability of DHH students to express their narrative. It has been found that students with deafness show lesser ability than their hearing peers in the structural aspect of the narrative discourse. Sometimes the difficulty stems from the differences between sign language and written language (Rath-mann, Mann & Morgan, 2007).
Method: Manny is a deaf student with attention deficit disorder who studies in a special needs school. During a composition lesson, Manny was required to share his personal experiences with his classmates. This task was very difficult for him and his stories lacked in sequence. The rest of the students found it difficult to understand him and as a result their attention level decreased. When Manny noticed this, he would give up and return to his place. This affected his sense of competence and the level of participation in the lesson. A qualitative approach to a case study was conducted. An intervention program was developed that integrates video modeling and video processing using the iMovie application. According to this method, Manny watched his video telling an experience story, then edited the video and finally watched it again so that he can learn what a correct narrative scheme is.
Key results: The findings show that the video Modeling served as a mirror for the student and reflected on his conduct during storytelling of his personal experience, to his classmates. In addition, as a result of the editing process, the student internalized the narrative scheme while maintains a temporal sequence and using connecters in a correct order. The processes indicates impressive progress of the student's of executive control of information and to his ability to initiate the editing process without the teacher mediation. In addition iMovie was found as an intuitive app for the student. It enabled him to implement the editing technique easily, thus facilitating the learning process of the narrative schema. The findings did not show the contribution to the student's planning and flexibility skills, nor to the extension of his attention range.
Conclusion: Children with deafness usually rely on their sight in order to absorb various experiences and information. Thus, watching his video before and after the editing process helped Manny to see easily where

his difficulties lay and facilitated the learning process. Moreover, it helped him correct easily his errors, improving his control skill while internalizing the narrative schema. There is still a need for continuing practice in order to enhance the level of the story that is being told

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Tidsskr Nor Laegeforen. 2019 Nov;139.

TOURETTE SYNDROME IN CHILDREN IN NORWAY.

Suren P, Bakken IJ, Skurtveit S, et al.

BACKGROUND: Tourette syndrome first appears in childhood and is characterised by chronic motor and vocal tics. In other countries, the mean prevalence is estimated at 0.77 % in children aged 6-15 years. Diagnostic practice and treatment have not been investigated in Norway.

MATERIAL AND METHOD: We used data retrieved from the Norwegian Patient Registry and the National Registry to calculate the percentage of children born during the period 2002-10 diagnosed with Tourette syndrome. The calculations were made for the country as a whole as well as by county. Drug therapy was investigated using data from the Norwegian Prescription Database.

RESULTS: By the age of 12, altogether 0.43 % had received a diagnosis of Tourette syndrome, broken down into 0.71 % for boys and 0.15 % for girls. The overall percentage varied from 0.15 % to 1.23 % between the counties. For Norway as a whole, the percentage of diagnoses remained stable between 2008 and 2016. Psychiatric and neurological conditions were often present - the most common being hyperkinetic disorder (50 %) and autism spectrum disorder (11 %). Antipsychotic drugs, probably for the treatment of tics, were prescribed for 16 % in the year following the diagnosis.

INTERPRETATION: The percentage of children with a diagnosis of Tourette syndrome is lower than the mean prevalence in population studies internationally. The diagnostic practice varies considerably from county to county

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Transl Behav Med. 2019 May;9:549-59.

PRIMARY CARE PROVIDER UTILIZATION AND SATISFACTION WITH A HEALTH SYSTEM NAVIGATION PROGRAM FOR ADOLESCENTS WITH BEHAVIORAL HEALTH NEEDS.

Yang Y, Dillon EC, Li M, et al.

Approximately 49.5% of the adolescents report a mental health disorder; only about half of the children and adolescents with mental health disorders seek treatment from a mental health professional. Stigma and poor access to behavioral health providers are leading barriers to care. A large ambulatory health system implemented a BH navigation program to facilitate referrals from primary care physicians (PCPs), including pediatricians and family physicians, to BH providers. We studied PCP adoption of BH navigation services over a 4-year period, from July 2014 to June 2018. We retrieved operational data regarding service utilization, patient information from electronic health records and PCP information from administrative data, and surveyed PCPs for their appraisals of navigation services. Four thousand five hundred and fifty-five referrals were made for 3,912 patients from 290 PCPs (71% of PCPs in the health system). Depression (39%), anxiety (25%), and attention-deficit hyperactivity disorder (7%) were the most frequent reasons for referral. Referrals increased dramatically in the first half of the study period and decreased afterwards. Ninety-one percent of the PCPs agreed or strongly agreed that navigation enhanced their clinical care at 12-month survey. More than 90% of the PCPs rated the referral process, communication with navigation staff, and the overall experience as above average or excellent at 12 months. There was a decrease in these evaluation indicators after 2.5 years. The initial high referral volume reflects a need for BH navigation services. However, challenges remain to maintain positive PCP assessment in the face of such demand

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Trends Psychiatry Psychother. 2019 May;41:167-75.

TRANSLATION AND CROSS-CULTURAL ADAPTATION OF THE MOTOR BEHAVIOR CHECKLIST (MBC) INTO BRAZILIAN PORTUGUESE.

Paiano R, Teixeira MCTV, Cantiere CN, et al.

INTRODUCTION: There are only a few instruments available to assess behavioral problems in school-age children based on reports of physical education teachers. The Motor Behavior Checklist (MBC) was designed to be completed by this professional in free play-situations or during physical education classes to rate students' motor-related behavior using 5-point Likert scales. The MBC comprises 59 items distributed into two broadband factors (externalizing and internalizing) and seven behavior problem scales: rule breaking, hyperactivity/impulsivity, lack of attention, low energy, stereotyped behaviors, lack of social interaction, and lack of self-regulation. The objective of this study was to describe the translation and cross-cultural adaptation processes of the MBC into Brazilian Portuguese.

METHOD: The following procedures were conducted: forward translation of the original instrument, production of a synthesized version, back-translation, literal and semantic comparison, back-translator's evaluation of divergent items, synthesized version with back-translator's suggestions, clarity assessment of the synthesized version by professionals (physical education teachers), focus group to assess clarity indicators of the instrument, evaluation of adjustments by the author of the instrument, and production of the final version.

RESULTS: The results indicated a satisfactory level of agreement between the original and the back-translated versions, with 68% of exact equivalence between the translated items and 16% of terms requiring minor adjustments. In the draft version, 84% of the items were evaluated as clear by physical education teachers.

CONCLUSION: The translated version has compatible content with the original version. Future studies should be conducted to assess the psychometric properties of the Brazilian Portuguese version of the MBC

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Trials. 2020;21.

INDIVIDUALISED STEPWISE ADAPTIVE TREATMENT FOR 3-6-YEAR-OLD PRESCHOOL CHILDREN IMPAIRED BY ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ESCAPRESCHOOL): STUDY PROTOCOL OF AN ADAPTIVE INTERVENTION STUDY INCLUDING TWO RANDOMISED CONTROLLED TRIALS WITHIN THE CONSORTIUM ESCALIFE.

Becker K, Banaschewski T, Brandeis D, et al.

Background: Attention-deficit/hyperactivity disorder (ADHD) is a psychosocially impairing and cost-intensive mental disorder, with first symptoms occurring in early childhood. It can usually be diagnosed reliably at preschool age. Early detection of children with ADHD symptoms and an early, age-appropriate treatment are needed in order to reduce symptoms, prevent secondary problems and enable a better school start. Despite existing ADHD treatment research and guideline recommendations for the treatment of ADHD in preschool children, there is still a need to optimise individualised treatment strategies in order to improve outcomes. Therefore, the ESCApreschool study (Evidence-Based, Stepped Care of ADHD in Preschool Children aged 3 years and 0 months to 6 years and 11 months of age (3;0 to 6;11 years) addresses the treatment of 3-6-year-old preschool children with elevated ADHD symptoms within a large multicentre trial. The study aims to investigate the efficacy of an individualised stepwise-intensifying treatment programme.

Methods: The target sample size of ESCApreschool is 200 children (boys and girls) aged 3;0 to 6;11 years with an ADHD diagnosis according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) or a diagnosis of oppositional defiant disorder (ODD) plus additional substantial ADHD symptoms. The first step of the adaptive, stepped care design used in ESCApreschool consists of a telephone-assisted self-help (TASH) intervention for parents. Participants are randomised to either the TASH group or a waiting control group. The treatment in step 2 depends on the outcome of step 1: TASH responders without significant residual ADHD/ODD symptoms receive booster sessions of TASH. Partial or non-responders of step 1 are randomised again to either parent management and preschool teacher training or treatment as usual.

Discussion: The ESCApreschool trial aims to improve knowledge about individualised treatment strategies for preschool children with ADHD following an adaptive stepped care approach, and to provide a scientific basis for individualised medicine for preschool children with ADHD in routine clinical care.

Trial registration: The trial was registered at the German Clinical Trials Register (DRKS) as a Current Controlled Trial under DRKS00008971 on 1 October 2015. This manuscript is based on protocol version 3 (14 October 2016)

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Turk Psikiyatri Derg. 2019;30:42-50.

RELIABILITY AND VALIDITY OF THE SCHEDULE FOR AFFECTIVE DISORDERS AND SCHIZOPHRENIA FOR SCHOOL-AGE CHILDREN-PRESENT AND LIFETIME VERSION, DSM-5 NOVEMBER 2016-TURKISH ADAPTATION (K-SADS-PL-DSM-5-T).

Unal F, Oktem F, Cetin CF, et al.

OBJECTIVE: The aim of this study was to evaluate the reliability and validity of the Schedule for Affective Disorders and Schizophrenia for School-Age ChildrenPresent and Lifetime Version, DSM-5 November 2016 -Turkish Adaptation (K-SADS-PL-DSM-5-T). METHOD: A total of 150 children and adolescents between 6 and 17 years of age were assessed with K-SADS-PL-DSM-5-T. The degree of agreement between the DSM-5 criteria diagnoses and the K-SADS-PL-DSM-5-T diagnoses were considered as the measure of consensus validity. In addition, concurrent validity was examined by analyzing the correlation between the diagnoses on K-SADS-PL-DSM-5-T and relevant scales. Interrater reliabilities were assessed on randomly selected 20 participants. Likewise, randomly selected 20 other participants were interviewed with K-SADS-PL-DSM-5-T three weeks after the first interview to evaluate test-retest reliability.

RESULTS: The consistency of diagnoses was almost perfect for eating disorders, selective mutism and autism spectrum disorder (kappa=0.92-1.0), substantial for elimination disorders, obsessive-compulsive disorder, oppositional defiant disorder, generalized anxiety disorder, social anxiety disorder, depressive disorders, disruptive mood dysregulation disorder and attention deficit hyperactivity disorder (kappa=0.67-0.80). Interrater reliability was perfect for selective mutism (kappa=1.0), substantial for oppositional defiant disorder, disruptive mood dysregulation disorder, attention deficit hyperactivity disorder, depressive disorders and social anxiety disorder (kappa=0.63-0.73). Test-retest reliability was almost perfect for autism spectrum disorder (kappa=0.82), substantial for attention deficit hyperactivity disorder, oppositional defiant disorder, disruptive mood dysregulation disorder, depressive disorders and generalized anxiety disorder (kappa=0.62-0.78).

CONCLUSION: The results of this study show that the K-SADS-PL-DSM-5-T is an effective instrument for diagnosing major childhood psychiatric disorders including selective mutism, disruptive mood dysregulation disorder and autism spectrum disorder which have recently been added to the schedule

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World Journal of Pediatrics. 2020.

THERAPEUTIC RESPONSE IN CHILDREN WITH ADHD: ROLE OF OBSERVERS AND-ÁSETTINGS .

Bhat V, Sengupta SM, Grizenko N, et al.

Background: This study aims at characterizing the extent of correlation of treatment response (TR) obtained in various observation settings (home, school, clinic) by different observers (parents, teachers, clinicians).

Methods: Children with attention deficit hyperactivity disorder (ADHD) underwent a 2-week double-blind, randomized, cross-over clinical trial with methylphenidate and placebo, and various measures were obtained during the 2-áweeks. Interrelationships of TR were examined using Pearson's correlation coefficients.

Results: The study included 526 children (420 male, 106 female) with ADHD. TR between different observers shows a variable correlation between parents and teachers. No correlation is seen between parents/teacher evaluation of TR and laboratory-based measures (Continuous Performance Task; Restricted Academic Situation Scale).

Conclusion: The results firmly support the need to synthesize information from many sources in evaluating TR in ADHD

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Zh Nevrol Psikhiatr Im S S Korsakova. 2019;119:12-19.

NEUROLOGICAL AND NEURODEVELOPMENTAL DISORDERS IN PRETERM-BORN CHILDREN (WITH EXTREMELY LOW, VERY LOW OR LOW BODY WEIGHT).

Zavadenko NN, Davydova LA.

AIM: To evaluate the incidence of neurological diseases and neurodevelopmental disorders in preterm-born children, aged 5-8 years, with extremely low (ELBW), very low (VLBW) or low body weight (LBW) at birth.

MATERIAL AND METHODS: One hundred and twenty-two preterm-born children, including 36 born with ELBW, 36 born with VLBW and 50 born with LBW, were examined in the age from 5 years 0 months to 8 years 0 months. Presenting complaints were assessed by means of the structured parents' questionnaire. Diagnosis of the nervous system diseases was based on the criteria of ICD-10 and DSM-V.

RESULTS AND CONCLUSION: Based on the assessment results, there was no any neurological or neurodevelopmental disorder in 8.3% (n=3) of children with ELBW, 16.7% (n=6) with VLBW, 22.0% (n=11) with LBW at birth. Compared to the general pediatric population, more preterm-born children with ELBW, VLBW or LBW, aged 5-8 years, had developmental dyspraxia, chronic motor tics, tension type headaches and enuresis. Moreover, the higher incidence was found for neurodevelopmental disorders, including attention deficit hyperactivity disorder, autism spectrum disorders, specific learning disabilities, compared with population rates. All conditions were more prevalent in boys than in girls, with the exception of tension type headaches. The frequency of disorders was inversely correlated with gestational age and body weight. However, the results demonstrate reserve capacities of the developing brain in children born preterm and suffered early brain damage

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A systematic review of coping strategies in parents of children with attention deficit hyperactivity disorder (ADHD)

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ABSTRACT

Background: Parents of children with attention deficit hyperactivity disorder (ADHD) use several coping strategies to deal with ADHD symptoms impacting family life.
Aim: The aim of this systematic review was to summarize the coping strategies used by parents of children with ADHD, identify which tools are most frequently used to measure coping strategies, and examine factors influencing parental coping.
Method: According to PRISMA guidelines, we searched for articles indexed in PubMed, EBSCOhost, Scopus, and Web of Science using a combination of expressions including "coping" AND "ADHD" OR "attention-deficit/hyperactivity disorder" AND "parent" OR "parenting" OR "caregiver".
Results: Fourteen empirical studies were identified as relevant to our research. Many different types of tools are used to assess coping strategies. We found that parents of ADHD children used more avoidant-focused coping strategies than parents of typical children. Mothers of ADHD children sought significantly more support and used more indirect means than mothers of typically developing (TD) children.
Conclusions: This review underlines the importance of further exploring coping mechanisms of parents of children with ADHD in order to promote positive coping strategies for parents of children with ADHD, and to help such parents to identify people who can support them.

What this paper adds?

Parents of ADHD children use coping strategies to deal with the challenge of raising their child. This systematic review adds to the extant literature by reporting the types of coping strategies used by parents of children with ADHD, the assessment tools, and relationships between these coping strategies and other variables such as family quality of life, depression symptoms and parenting stress.

1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder (NDD) marked by an ongoing pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development (American Psychiatric Association, 2013). Although there is no global consensus, recent meta-analyses reported a 7.2 % prevalence in children and adolescents and a 3.4 %

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prevalence in adults (Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007; Thomas, Sanders, Doust, Beller, & Glasziou, 2015). Significant child-level predictors of parenting stress in families of children with ADHD include severity of child ADHD symptoms in general (Theule, Wiener, Tannock, & Jenkins, 2013), hyperactivity (Breen & Barkley, 1988), and inattention/distractibility (Podolski & Nigg, 2001). Externalizing behavior such as irritability, behavioral problems like aggressiveness and oppositional behavior, has often been found to be an even more potent predictor of parenting stress (Bauermeister et al., 2010; Jensen et al., 2001; Pimentel, Vieira-Santos, Santos, & Vale, 2011; Wiener, Biondic, Grimbos, & Herbert, 2016) in the parents of children with ADHD. Furthermore, some studies also have underlined the influence of internalizing symptoms such as emotional regulation deficits, low frustration tolerance, and poor sustained attention (Graziano, McNamara, Geffken, & Reid, 2011; van Stralen, 2016). All these symptoms have a negative impact on individual family members as well as the family as a whole (Muñoz-Silva, Lago-Urbano, Sanchez-Garcia, & Carmona-Márquez, 2017). A considerable amount of literature has clearly shown that parents of ADHD children experience more stress and lower self-esteem on a personal and parenting level than parents of typically developing (TD) children, and severity of ADHD symptoms was associated with parenting stress (Chen et al., 2017; Muñoz-Silva et al., 2017; Perez Algorta et al., 2014). Furthermore, parents of ADHD children reported greater parenting stress than parents of children with other NDDs such as autism spectrum disorder (ASD) (Miranda, Tárraga, Fernández, Colomer, & Pastor, 2015) and learning or language disorders (Craig et al., 2016). Indeed, living in a family with a child with ADHD has been described as chaotic, conflictual and exhausting, and it is known that parents experience frustration, stress, depression, and anxiety (Lesesne, Visser, & White, 2003). It was also observed that having a child with ADHD may not only be linked to emotional variables, but also to many social, physical, and economic/financial problems (Hartley et al., 2010; Laskar, Gupta, Kumar, Sharma, & Singh, 2010) likely affecting parental quality of life (Muñoz-Silva et al., 2017).

1.1. Stress coping in parents and caregivers of children with ADHD

Coping can be defined as the cognitive and behavioral efforts made to master, tolerate or reduce the external and internal demands and conflicts created by stressful situations (Folkman, 1984). The techniques used to deal with stress have been defined as coping strategies. Thus, coping skill can be conceptualized as a combination of coping style and range of implementable coping strategies (Sahler & Carr, 2009). Although numerous coping strategies have been identified, reaching a consensus on their classification is quite challenging for researchers. Lazarus and Folkman defined coping as “the cognitive and behavioral efforts made to master, tolerate, or reduce external and internal demands appraised as taxing or exceeding the resources of the individual” (Lazarus & Folkman, 1984) and grouped coping strategies into three types: problem-focused coping strategies allowing individuals to confront a situation directly; emotion-focused coping strategies are attempts to manage emotional tension; social support-seeking is a coping strategy in which efforts are made to obtain sympathy and/or help from others. Data from several studies suggest that certain forms of coping, such as emotion-focused coping strategies, are positively correlated with more maladaptive mental health outcomes in parents of children with an NDD (Hassall, Rose, & McDonald, 2005; Hastings et al., 2005), while problem-focused coping strategies and social support-seeking coping strategies are positively correlated with lower parental stress and higher positive moods (Arzani, Valizadeh, Zamanzadeh, & Mohammadi, 2015; Guralnick, 2012). Parents of ADHD children show similar trends: adaptive and maladaptive coping strategies have been reported to relate positively with depression symptoms and negatively with anxiety symptoms (Theule, Wiener, Rogers, & Marton, 2010). In addition, factors such as child’s age, symptom severity, and demographic variables (e.g. parental educational level, economic status, marital status, and gender of parents) each play a role in the way parents cope with their children (Algood & Harris, 2013; Higgins, Bailey, & Pearce, 2005; Rubin, Burgess, & Hastings, 2002).

To explain the relationship between parenting stress and children’s ADHD symptoms, some researchers suggest that behaviors of children with ADHD generate elevated levels of parental stress which in turn lead to negative parenting styles (e.g., inconsistent discipline, and corporal punishment) which reinforce the unsuitable conducts of children (Muñoz-Silva et al., 2017; Patterson, 2002). In accordance with this hypothesis, Mackler et al. have demonstrated that the children’s externalizing behavior problems affect the parenting stress more than parenting stress affects the children’s problems (Mackler et al., 2015).

Moreover, it must be noted that a variety of tools are used to measure coping strategies in clinical and research areas but there are no gold standards against which to compare the capacity of tests to detect coping skills. Therefore, it is difficult to compare studies investigating the same construct, yet with different questionnaires. In addition, culture may greatly influence how people comprehend and define coping strategies (Berjot & Gillet, 2011).

Despite a growing interest in coping strategies used with ADHD children, a systematic review on types of coping strategies, measures used, or relationships between these strategies and other variables is still lacking. For this systematic review, we followed the PRISMA standards, a five-phase process including: (1) formulate the questions, (2) identify the relevant studies, (3) assess the quality of the studies, (4) summarize the evidence, and 5) interpret the findings.

1.2. Review aims

Broadly speaking, this review seeks to provide a summary of coping approaches used by parents and caregivers of children with ADHD, as well as an overview of coping factors and coping outcomes to assist healthcare providers in operationalizing resources and support for families of ADHD children. Thus, the main aim of this systematic review was to (1) summarize coping strategies used by parents and caregivers of ADHD children, (2) identify which tools are most frequently used to measure coping strategies in parents or caregivers of ADHD children, (3) report on the psychosocial outcomes of parent/caregiver coping in ADHD, and (4) examine factors influencing parental/caregiver coping in ADHD.

2. Material and methods

2.1. Study selection and data collection processes

This review was performed according to PRISMA guidelines (Liberati et al., 2009). A search of the literature in databases such as PubMed, Scopus, Web of Science, and EBSCOhost confirmed that there were no recent, comprehensive reviews on coping strategies in parents of ADHD children. All database searches were conducted on July 2th, 2018 using a combination of the following free-text terms: “coping” AND “ADHD” OR “attention-deficit/hyperactivity disorder” AND “parent” OR “parenting” OR “caregiver”.

In the first stage, duplicates were excluded prior to retrieval of references. After this initial literature search, titles and abstracts were subsequently assessed by two reviewers (FC and IF) for their relevance in accordance to inclusion/exclusion criteria. Papers were rejected if they (1) were clearly not dealing with parental coping strategies; (2) were not published in English; (3) were qualitative studies or theses/dissertations; (4) were case reports or case series; (5) were review papers; (6) did not report the study methodology; (7) were doctoral dissertations or master’s theses. The full text of all potentially relevant studies was subsequently retrieved and further examined for eligibility. All references included in the papers identified as relevant from database searches were also examined for possible inclusion in this review.

2.2. Eligibility criteria

The studies included in this review met the following six criteria: They investigated coping strategies used by parents/caregivers of ADHD children; (2) used quantitative questionnaires to examine coping strategies; (3) enrolled children or adolescents aged under 18 years; (4) were published in peer-reviewed journals; and (5) were original research articles. No date limitations were placed on the search of these databases above. Data were extracted independently by FC and IF and disagreements were resolved by negotiation with a third author (AT). Agreement as to whether or not the study met the inclusion criteria was 100 %.

2.3. Data extraction

Studies meeting the inclusion criteria were summarized in terms of: (1) Study characteristics: type of study and country where data were collected; (2) characteristics of children: number of subjects in each group, age, sex, diagnosis, and co-morbidities; (3) characteristics of parents: number of fathers, mothers, or other caregivers, age, sex, marital status, employment status; (4) diagnostic criteria; (5) tools used to measure coping or other outcome measures; and (6) main results.

2.4. Study quality assessment

Study quality was evaluated using the quality assessment tools from the Risk Assessment Workgroup of the Department of Health and Human Services from the U.S. National Institute of Health (National Heart, L. & Blood Institute, 2016). We assessed quality by two different tools: (1) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, and (2) Quality Assessment of Case-Control Studies. Each questionnaires assess bias, confounders, power, and strength of association between intervention and outcomes. Each question could be answered “yes (score = 1),” “no (score = 2),” “cannot determine,” “not reported,” or “not applicable”. A total score was calculated for each study. Studies were then rated as poor (total score less than 4 points), fair (total score between 5 and 8 points), or good (total score between 9 and 12 points), based on the scores obtained. Two independent assessors (IF, EL) not involved in any other aspects of the study completed the questionnaires. In case of disagreement, a third author was contacted (LR)

3. Results

Our search strategy yielded 542 studies (PubMed n = 277, Scopus n = 127, Web of Science n = 104, and EBSCOhost n = 34). After excluding duplicate publications, we identified 282 potential articles. In the screening phase, titles and abstracts of all identified studies were examined. This led to the exclusion of 229 studies, as they were not deemed suitable for the present review. Consequently, 53 studies were selected for the eligibility phase. Out of these, 38 studies were excluded because they did not meet selection criteria. Finally, 14 empirical studies were ultimately identified as relevant to our research (Table 1). The PRISMA flow diagram (Fig. 1) provides more detailed information on the study selection process.

3.1. Study quality

The quality rating was “fair” for four studies (Bailey, Barton, & Vignola, 1999; Gisladottir & Svavarsdottir, 2017; Tancred & Greeff, 2015; Woodward, Dowdney, & Taylor, 1997), and “good” for the remaining 10 (Borden et al., 2016; Cappe, Bolduc, Rougé, Saiag, & Delorme, 2017; Durukan et al., 2008; Keown & Woodward, 2002; McKee, Harvey, Danforth, Ulaszek, & Friedman, 2004; Podolski & Nigg, 2001; Predescu & Şipoş, 2013; Shenaar-Golan, Wald, & Yatzkar, 2017; Woodward, Taylor, & Dowdney, 1998; Zhu et al., 2015).

Table 1
Sample and characteristics of included studies.

Authors	Type of study (Nation)	Number of children (N)	Mean age of children ± sd	Diagnosis-related groups	Comorbidities	Number of parents (N)
Woodward et al. (1997)	case-control (New Zealand)	27 (m)	pervasively hyperactive: 8 ± 133; TD: 9 ± 1,25	14 referred pervasively hyperactive, 13 nonreferred pervasively hyperactive	conduct disorder	27 mothers
Woodward et al. (1998)	case-control (UK)	58 (m)	pervasively hyperactive: 9 ± 12 months; TD: 9 ± 11 months.	28 pervasively hyperactive, 30 TD	conduct disorder	58 mothers
Bailey et al. (1999)	case-control (Australia)	68 (55 m, 13 f)	ADHD: 12.32 ± 2.21, TD: 7.93 ± 3.29	38 ADHD, 30 TD	16 (conduct disorders, oppositional-defiant disorder, anxiety disorders)	68 mothers
Podolski and Nigg (2001)	cross-sectional (USA)	66 (42 m, 24 f)	7.22 ± 2.32	15 ADD, 22 ADHD–C,3 ADHD hyperactive subtype, 3 subclinical ADHD problems or ADHD NOS, 1 ADD with borderline IQ, 22 TD	3 (20 %) ADD + ODD, 13 (59 %) ADHD-C + ODD, 5 (22 %) ADHD-C + CD	66 mothers, 57 fathers
Keown and Woodward (2002)	case-control (New Zealand)	67 (m)	Hyperactive: 56.81 ± 3.00 months; TD: 54.94 ± 3.56 months	33 pervasively hyperactive, 34 TD	conduct disorder	67 mother
McKee et al., 2004	prospective longitudinal (USA)	49 (45 m, 4 f)	7.22 ± 2.32	ADHD	100 % oppositional behavior	46 mothers, 26 fathers
Durukan et al. (2008)	case-control (Turkey)	60 (46 m, 14 f)	ADHD: 9.1 ± 1.7, TD: 8.96 ± 1.40	30 ADHD (21 ADHD-C, 5 ADD, 4 hyperactive-impulsive), 30 TD	oppositional behavior	60 mothers
Predescu and Şipoş (2013)	cross-sectional (Romania)	114 (58 m, 56 f)	ADHD: 7.61 ± 3.13; ASD: 6.46 ± 2.17	49 ADHD, 65 ASD	–	114 mothers
Tancred and Greeff (2015)	cross-sectional (South Africa)	98 (80 m, 18 f)	9.5 yr	ADHD	33 (34 %) with at least one co-morbid condition: sensory disintegration (n = 12, 36 %), depression (n = 6, 18 %), general anxiety disorder (n = 5, 15 %), Asperger's disorder (n = 4, 12 %), conduct disorder (n = 3, 9 %), oppositional defiance disorder (n = 2, 6 %) and Tourette's disorder (n = 1, 3 %)	98 mothers
Zhu et al. (2015)	prospective longitudinal (China)	1765 (951 m, 814 f)	48–54 months	226 ADHD	–	1765 mothers
Borden et al. (2016)	case-control (USA)	267		26 ADHD + depression, 111 ADHD, TD 130	26 depression	267 mothers
Gisladottir and Svavarsdottir (2017)	quasi-experimental design-prospective longitudinal (Iceland)	40 (26 m, 11 f, 3 missing)	13–17 yr	4 ADHD, 31 ADHD and other diagnosis, 5 Missing	8 (25.8 %) Asperger syndrome/autism spectrum, 13 (41.9 %) Anxiety and/or depression, 7 (22.6 %) ODD, 1 (3.2 %) Physical disorder, 2 (6.5 %) Other diagnosis	38 mothers, 21 fathers, 1 missing
Shenaar-Golan et al. (2017)	case-control (Israel)	177	6–12 yr	98 ADHD, 79 TD	–	146 mothers, 31 fathers
Cappe et al. (2017)	cross-sectional (France)	110 (83 m, 27 f)	7.7 ± 2.4 yr	ADHD	none (exclusion criteria)	73 mothers, 17 fathers

Note. Attention deficit hyperactivity disorder (ADHD), standard deviation (SD), male (m), female (f), Typical Development (TD), ADHD inattentive subtype (ADD), ADHD combined subtype (ADHD–C), ADHD not otherwise specified (NOS), oppositional defiant disorder (ODD), conduct disorder (CD).

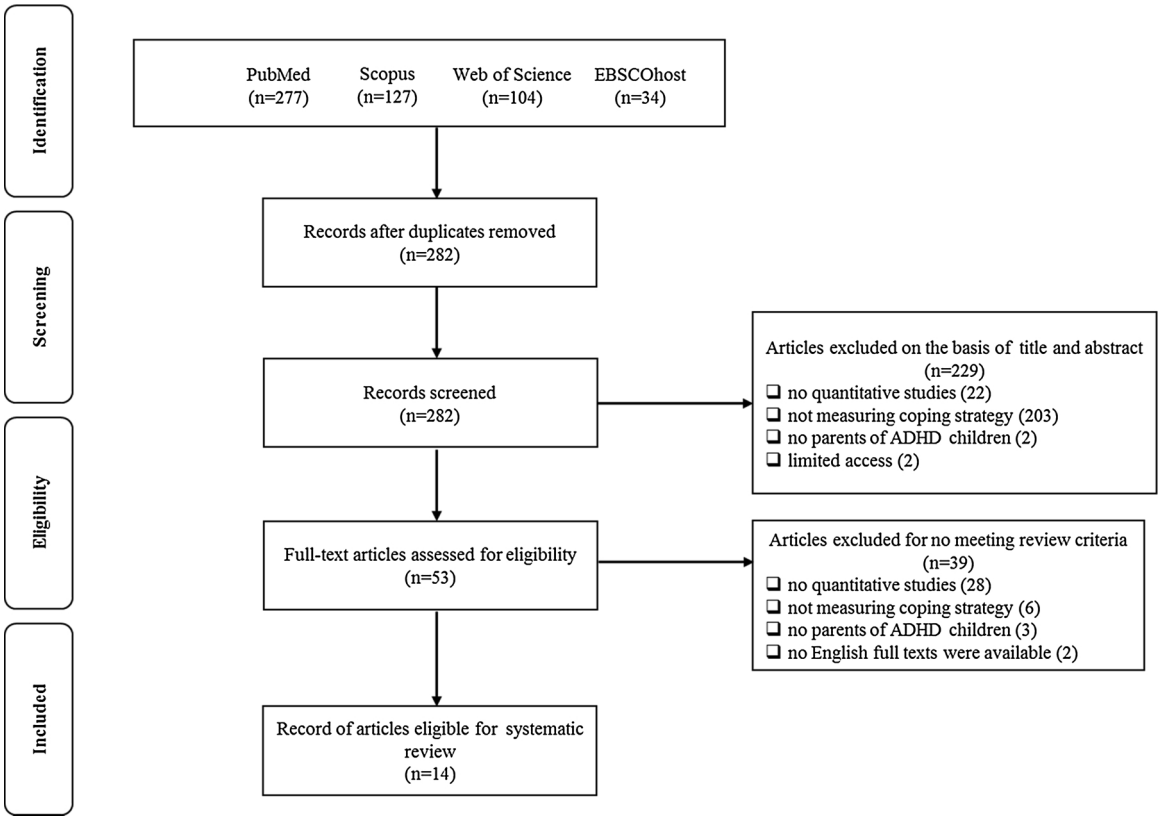

Fig. 1. The PRISMA flow diagram provides more detailed information regarding the selection process of studies.

3.2. Study characteristics

The main methodological features and general characteristics of all reviewed studies are summarized in Table 1. They included seven case-control studies (Bailey et al., 1999; Borden et al., 2016; Durukan et al., 2008; Keown & Woodward, 2002; Shenaar-Golan et al., 2017; Woodward et al., 1997, 1998), four cross-sectional studies (Cappe et al., 2017; Podolski & Nigg, 2001; Predescu & Şipoş, 2013; Tancred & Greeff, 2015), and three longitudinal studies; Gisladottir & Svavarsdottir, 2017; McKee et al., 2004; Zhu et al., 2015). With respect to research methodology, there were no randomized controlled trials. All studies were published from 1997 to 2017. Three of the included studies had been conducted in the USA, 2 in New Zealand, 1 in Turkey, 1 in Australia, 1 in South Africa, 1 in Romania, 1 in Iceland, 1 in Israel, 1 in France, 1 in China, and 1 in the United Kingdom.

3.3. Characteristics of children

These 14 studies 2966 (1038 male, 981 female) children, 936 of whom met the criteria for ADHD, 65 children met the criteria for ASD, 88 boys were pervasively hyperactive, and 434 children were TD children. Two studies did not specify the sex of children. Sample sizes ranged from 14 to 226 children with ADHD. Two studies provided subtypes of ADHD (combined, inattentive and hyperactive-impulsive). In terms of child characteristics, 42.8 % of all reviewed studies reported a prevalence of co-morbidities in ADHD children.

3.4. Characteristics of parents

The reviewed studies included 2893 mothers and 131 fathers (Table 2). 64 % of the reviewed studies reported parents' age: mean ages ranged between 20 and 41 years for mothers and between 36 and 46 years for fathers. Marital status was reported in 50 % of these studies, employment status was reported in 35.7 % of the studies, and education level was reported in 57.1 % of the studies.

3.5. ADHD diagnostic criteria and assessment tools

ADHD can potentially be assessed both categorically and dimensionally (Table 2). Nine studies used a categorical approach based on the Diagnostic and Statistical Manual of Mental Disorders (DSM) (n = 8) or the International Classification of Diseases (ICD; n = 1) to define ADHD. Three studies used a dimensional approach to the diagnosis of ASD. The Conners' Rating Scale (CRS), the gold

Table 2
Socio-demographic characteristics of parents, diagnostic criteria and assessment tools.

Authors	Marital status	Employment status	Education level	Diagnosis establishment	Coping measures/other outcome measures
Woodward et al. (1997)	–	–	–	Parental Account of Children's Symptoms (PACS) Interview	CRPR, semi-structured interview/PACS
Woodward et al. (1998)	–	–	mean years of schooling: 2.21 (pervasively hyperactive), 2.57 (TD)	DSM-IIIR	CRPR / PACS, GHQ, DAS, SOS
Bailey et al. (1999)	ADHD: 71 % were married, 21 % separated/divorced, 3 % defacto relationship, 5 % were single; TD: 80 % were married, 17 % separated/divorced, 3 % defacto relationship	ADHD: 26 %full-time, 42 % part-time, 8 % students (part-time), 16 % engaged in home duties, 8 % "other"; TD: 20 % employed full-time, 37 % part-time, 7 % students (full-time), 30 % engaged in home duties, 6 %"other"	–	–	ad hoc questionnaire
Podolski and Nigg (2001)	–	–	–	DSM-IV	F-COPES / PSS
Keown and Woodward (2002)	Hyperactive: 12 % Single-parent family, TD: 5.8 % Single-parent family	–	mean years of schooling:3.18 ± 1.53 (hyperactive), 3.85 ± 1.60 (TD); Paternal education: 3.27 ± 1.48 (hyperactive), 4.16 ± 1.59 (TD)	Preschool Behavior Questionnaire (PBQ), Parental Account of Children's Symptoms (PACS)	semi-structured interview / PACS
McKee et al. (2004)	–	–	Mean years of schooling: 14.5	DSM–IV–TR	COPE / Parenting Scale, Audiotape assessment of parenting, BASC–PRS, BDI
Durukan et al., 2008	–	–	> primary level of education	DSM-IV	COPE / BDI, BAS
Predescu and Şipoş (2013)	ADHD: 40 (81.6 %)married; ASD: 55 (84.6 %) married	ADHD: 38 (77.6 %)employed; ASD: 58 (89.2 %)employed	Less than 12th grade: 8 (16.3 %) ADHD, 4 (6.2 %) ASD; Bachelor's degree: 28 (57.1 %) ADHD, 37 (56.9 %) ASD; Graduate degree: 13 (26.6 %) ADHD; 24 (36.9 %) ASD	DSM IV-TR	CERQ / FQoL
Tancred and Greeff (2015)	84 married and 14 single-parent families	–	4 primary school, 29 high school, 31 diploma, 34 degree	DSM 5	F-COPES / PSDQ, FACI8
Zhu et al. (2015)	–	–	≤9 years school education: 298 (16.9 %); > 9 years school education: 1467 (83.1 %)	Conners' Hyperactivity Index	TCSQ / PLEC
Borden et al. (2016)	–	–	–	DSM-IV-TR	BASC-PPP / FES
Gisladottir and Svavarsdottir (2017)	40 Married/cohabiting, 5 Divorced, 3 Divorced and married again, 10 Single parent, 2 Missing data	30 Full time employment, 5 Less than full time employment, 5Full time employment and working Elsewhere, 11 Homemaker, 8 Missing data	–	ICD-10	CHIP / ICEPFSQ, ICE-FIBQ, GWBS, PedsQL, ICEEFFQ
Shenaar-Golan et al. (2017)	ADHD: 81 (82.7 %) married; TD 69 (87.3) married; TD: 67 (84.8 %)	ADHD: 81 Mother employed, 82 Father employed; TD: 67 Mother employed, 67 Father employed	mean years of schooling: 16.4 (ADHD), 16.5 (TD)	child diagnosed with ADHD by either a child psychiatrist or neurologist	CCNES / PERI-2,
Cappe et al. (2017)	71 (78.9 %) common-law marital status	42 (46.7 %) full-time, 35 (38.9 %) part-time time, 13 (14.4 %) unemployed	undergraduate or lower educational level (47)	DSM-IV	WCC-R / ALES, CLCS, QSSP, QoLP

Note. Attention deficit hyperactivity disorder (ADHD), Typical Development (TD), Diagnostic and Statistical Manual of Mental Disorders (DSM–IV), Classification of Mental and Behavioural Disorders (ICD-10).

Coping measures: Scale for Evaluation of Coping Behavior (COPE), Family Crisis Oriented Personal Evaluation Scales (F-COPES), Child-Rearing Practices Report (CRPR), Cognitive-Emotional Regulation Questionnaire (CERQ), Coping Style Questionnaire (TCSQ), Behavioral Assessment System for Children–Parent Personality Profile (BASC-PPP), Coping Health Inventory (CHIP), Coping with Children's Negative Emotions Scale (CCNES), Ways of Coping Checklist-Revised (WCC-R).

Other outcome measures: Beck Depression Inventory (BDI), Beck Anxiety Scale (BAS), SatisfactionWith Parenting Performance (SPP), ICE-Family Perceived Support Questionnaire (ICEPFSQ), ICE-Family Illness Beliefs Questionnaire (ICE-FIBQ), General Well-Being Schedule (GWBS), Parenting Satisfaction Scale (PSS), Parenting Styles and Dimensions Questionnaire (PSDQ), Family Attachment and Changeability Index 8 (FACI8), Family Quality of Life Survey (FQoL), The Peds QL Family Impact Module (PedsQL), ICE Expressive Family Functioning Questionnaire (ICEEFFQ), parental emotion regulation inventory (PERI-2), Appraisal of Life Events Scale (ALES), Cancer Locus of Control Scale (CLCS), Perceived Social Support (QSSP), quality of life for parents (QoLP), Prenatal Life Events Checklist (PLEC), Parental Account of Children's Symptoms Interview (PACS), General Health Questionnaire (GHQ), Dyadic Adjustment Scale (DAS), Signicant Others Scale (SOS), e Parental Account of Children's Symptoms (PACS), Family Environment Scale (FES).

standard for the diagnosis of ADHD, was used in one study. The Preschool Behavior Questionnaire (PBQ) and Parental Account of Children's Symptoms (PACS) scales were used in one and two studies, respectively. One study reported that ADHD diagnosis was provided by either a child psychiatrist or neurologist, while another study did not provide diagnostic details.

3.6. Coping questionnaires

Self-administered or non-standardized measures were used to assess parental/caregiver coping strategies in the 14 selected studies. Three groups of studies based on the type of measures emerged. Table 2 summarizes the coping questionnaires *used in the selected studies.*

3.6.1. Standardized questionnaires

The first group comprises nine studies evaluating coping strategies through standardized questionnaires. Two studies (Durukan et al., 2008; McKee et al., 2004) used the Scale for Evaluation of Coping Behavior (COPE) (Carver, Scheier, & Weintraub, 1989). Two other studies (Podolski & Nigg, 2001; Tancred & Greeff, 2015) administered the Family Crisis Oriented Personal Evaluation Scales (F-COPES) (HI McCubbin, Olson, & Larsen, 1996). Predescu and Şipoş used the Cognitive-Emotional Regulation Questionnaire (CERQ) (Garnefski, Kraaij, & Spinhoven, 2001) to assess cognitive coping strategies (Predescu & Şipoş, 2013). Cappe et al. adapted the French version of the Ways of Coping Checklist-Revised (WCC-R) (Cappe, Wolff, Bobet, & Adrien, 2011) to evaluate how parents coped with the stress caused by their ADHD children (Cappe et al., 2017). Shenaar-Golan et al. (2017) investigated coping strategies through the Coping with Children's Negative Emotions Scale (CCNES) (Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002). Gisladottir and Svavarsdottir (2017) adopted the Coping Health Inventory (CHIP) (HI. McCubbin et al., 1983). Zhu et al. (2015) used the Chinese revised edition of the Trait Coping Style Questionnaire (TCSQ) (Wang & Xilin, 1999).

3.6.2. Subscales of standardized questionnaires

The second group comprises three studies evaluating coping strategies through subscales of standardized questionnaires. Borden et al. (2016) administered the Behavioral Assessment System for Children–Parent Personality Profile (BASC-PPP) (Reynolds & Kamphaus, 1992) to all enrolled parents. Two studies (Woodward et al., 1997, 1998) used the 91-item Child-Rearing Practices Report (CRPR) (Block, 1980).

3.6.3. Non-standardized measures

The third group comprises two studies using non-standardized measures of coping. Keown and Woodward used an interview-based parenting measure to assess efficiency of parental coping (range 0–7) which provides a measure of how well parents cope rather than the way in which they do cope (Keown & Woodward, 2002); Bailey et al. (1999) measured coping by a questionnaire constructed specifically for their study.

3.7. Coping styles in parents of ADHD

Table 3 presents a summary of findings of each study included in the review.

Seven articles compared coping strategies in parents of ADHD children and parents of TD children. Woodward et al. examined child and family factors associated with clinical referral of pervasively hyperactive children vs. non-clinic-referred pervasively hyperactive children living in the same geographical area (Woodward et al., 1997) and found that parents of clinic-referred children with hyperactivity were coping less well and were generally failing to help improve their children's behavior problems vs. parents of non-clinic-referred children with hyperactivity ($F = 26,71$, $p < 0.05$). In addition, clinic-referred children were significantly more likely to be disciplined in an aggressive manner (shouting, threatening, and smacking), with parental control being less effective than in community children. In another study, Woodward et al. suggested that parents of hyperactive children were less sensitive to their children's needs and were coping less efficiently with child behavior ($p < 0.001$) than parents of healthy children (Woodward et al., 1998).

Children whose parents were coping less well with their behavioral problems were 3.3 times more likely to be hyperactive, and 2.5 times more likely to be hyperactive if their parents used harsh and aggressive discipline methods.

Bailey et al. reported that mothers of ADHD children ($F = 3.50$; $p = 0.001$) tended to use more indirect coping strategies, such as seeking support and using avoidance coping, compared to mothers of TD children (Bailey et al., 1999). They found that mothers of ADHD children tended to use coping strategies significantly more often, indicating that the need to continually monitor, manage and cope is likely to be more exhausting in terms of physical and psychological resources. Keown and Woodward obtained similar results (Keown & Woodward, 2002) with parents of hyperactive boys, with greater mean scores for both maternal coping ($p < 0.0001$) and paternal coping ($p < 0.0001$), and found that children were 13.6 times more likely to be hyperactive if their mothers were coping less well with their behavior problems. Their analysis revealed that the best parenting predictor of preschool hyperactivity was maternal coping, which successfully classified 76 % of the hyperactive cases and 85 % of the control children. The odds ratio for maternal coping was 11.78 (CI 3.69–37.63). Durukan et al. found significantly higher dysfunctional coping style scores in the ADHD group ($F = 2.56$, $p = 0.01$) compared with mothers of the healthy group (Durukan et al., 2008) Borden et al. showed poorer maternal coping in mothers ($F = 39.53$, $p = .35$) of ADHD children (with or without comorbid depression) compared with mothers of community children (Borden et al., 2016). Moreover, when compared with ADHD children and community controls, mothers of depressed ADHD children reported difficulty coping with parenting roles. Contrary to previous studies, Shenaar-Golan et al. found no statistical

Table 3
Findings on parental coping in children with ADHD.

Authors	Findings
Woodward et al. (1997)	Parents of clinic-referred children with hyperactivity were coping less well and were generally failing to help improve child behaviour problems, compared to parents of nonreferred children with hyperactivity
Woodward et al. (1998)	Parents in the hyperactive group were less sensitive to child needs and were coping less efficiently with child behaviour than parents in the control group
Bailey et al. (1999)	• Mothers of children with ADHD sought significantly more support and used more indirect means than mothers of normal children. • Mothers of ADHD children reported a higher frequency of use of coping and management strategies. No significant differences in any of the coping strategies based on maternal age, gender and marital status. • Mothers of children with ADHD and a comorbid condition used rational coping strategies more frequently than the comparison group • No significant differences on any of the coping strategies based on the medication status of the child
Podolski and Nigg (2001)	Lower maternal PSS dissatisfaction was associated more strongly with more use of positive reframing than with more use of community resources, but not spiritual support. For fathers, positive reframing was also the most notable coping strategy.
Keown and Woodward (2002)	• The best parenting predictor of preschool hyperactivity was maternal coping, which successfully classified 76 % of the hyperactive cases and 85 % of the control children. • After adjustment for the effects of child conduct problems, child age, paternal age, and paternal education, found that maternal and paternal coping continued to be significantly associated with preschool hyperactivity
McKee et al. (2004)	• Mothers: seeking social support was negatively correlated with avoidant-focused coping and positively correlated with adaptive-focused coping. • Fathers: seeking social support was related to adaptive-focused coping as well as focusing on/venting of emotions. • Avoidant-focused coping and adaptive-focused coping were inversely related for both mothers and fathers • For mothers, greater reported depression was associated with greater use of avoidant-focused coping, less use of adaptive- focused coping, and less seeking social support. • For fathers, only the correlation between avoidant-focused coping and depression was significant.
Durukan et al. (2008)	• Dysfunctional coping style scores are significantly higher in the ADHD group compared with mothers of healthy group
Predescu and Şipoş (2013)	• A significant correlation between strategy CERQ blame and Family Quality of Life
Tancred and Greeff (2015)	• Authoritative parenting style have a significant positive correlation with the reframing of a problem as a coping style • Regulation dimension had a significant positive correlation with a passive appraisal coping style • Passive appraisal coping style also showed significant negative correlations with the authoritarian parenting style • Physical coercion dimension and the authoritarian parenting style showed a significant positive correlation with the seeking of spiritual support as a coping style • Authoritarian parenting style and the verbal hostility dimension showed a significant positive correlation with the coping style of acquiring social support • The use of medication played a vital role in controlling key symptoms of ADHD and the general coping ability of the parents and the family as a whole
Zhu et al. (2015)	• For males, ADHD symptoms were positively correlated with avoidance coping, but negatively correlated with social support. • After adjusting for all of the confounding variables, prenatal SLEs, maternal social support and avoidance coping independently contributed to the variance in ADHD symptoms in male.
Borden et al. (2016)	• Mothers of the non-depressed ADHD group felt less capable of coping with their parental role than mothers in the control group • When compared with community controls, the mothers of depressed ADHD children reported more parental depressive symptoms, decreased perceived capability of coping with their parental role, decreased control or influence on their child's behavior, and a decreased sense of communication and closeness with their children.
Gisladottir and Svavarsdottir (2017)	• Caregivers of people with ADHD who received the Therapeutic Conversation Intervention perceived significantly better family functioning and parental coping post-intervention than preintervention
Shenaar-Golan et al. (2017)	• no statistical difference in the six coping subscales (distress reactions, punitive reactions, minimization reactions, expressive encouragement, emotion-focused reactions, and problem-focused reactions) between parents of children with and without ADHD, • parents of children with ADHD used more emotion regulation strategies than parents of children without ADHD.
Cappe et al. (2017)	• Severity of the disorder in children, and the conflicting relationships they generate, increase parental stress and use of inappropriate coping strategies. • Furthermore, hyperactivity index and stress ratings relative to perceiving the situation as a threat or a loss, and adopting emotion-focused coping strategies, predicted poorer quality of life.

Note. Attention deficit hyperactivity disorder (ADHD), Cognitive-Emotional Regulation Questionnaire (CERQ), prenatal stressful life events (SLEs).

difference in the six coping subscales (distress reactions, punitive reactions, minimization reactions, expressive encouragement, emotion-focused reactions, and problem-focused reactions) between parents of children with and without ADHD (Shenaar-Golan et al., 2017).

3.7.1. Relationship between coping and interventions for parents

Two studies looked at interventions designed to facilitate coping in parents of ADHD children. McKee et al. examined the relation between parental coping styles, discipline, and child behavior before and after participating in a parent training program for parents

of ADHD children and oppositional behavior (McKee et al., 2004). Prior to parent training, use of more avoidant-focused and less adaptive coping styles was related to more self-reported lax discipline for fathers, and maladaptive coping styles were also related to mothers' pre-treatment self-reported lax and overactive discipline as well as observed coercive parenting and child misbehavior. However, mothers' coping styles appeared to be unrelated to the level of their discipline and children's behavior measured after parenting training, whereas lax parenting measured after parent training was greater in fathers who used more avoidant-focused coping ($r = 0.46$, $p < 0.05$) and lower in fathers who used more adaptive-focused coping ($r = -0.60$, $p < 0.01$). The authors pointed out that fathers seeking support to a lesser extent and choosing adaptive-focused coping showed the most improvement in their children's behavior. Other authors evaluated the effectiveness of the Therapeutic Conversation Intervention (TCI) on caregivers of adolescents with ADHD in strengthening their supportive role (Gisladottir & Svavarsdottir, 2017). Caregivers receiving the TCI perceived significantly better family functioning and quality of life post-intervention. However, there were no statistically significant changes in coping strategies (family solution, parental solution and illness solution) after the TCI.

3.7.2. Relationship between coping and family quality of life

Two studies analyzed the correlation between coping and familial quality of life. One study showed that use of emotion-focused coping strategies ($r = 0.61$; $p < 0.001$) predicted a poorer quality of life (Cappe et al., 2017). Predescu and Şipoş compared cognitive coping strategies in mothers of ADHD children vs. mothers of children with ASD (Predescu & Şipoş, 2013). For the ADHD group, the only strategy that correlated negatively with the overall assessment of familial quality of life was the 'blame others' strategy ($r = -0.37$; $p < 0.01$).

3.7.3. Relationship between coping and depression symptoms

McKee et al. explored the association between coping strategies and depression symptoms in parents (McKee et al., 2004). Coping styles were related to parent scores on a rating scale for depression symptoms. For mothers, greater reported depression was associated with greater use of avoidant-focused coping ($r = 0.44$), less use of adaptive-focused coping ($r = –0.41$), and less social support-seeking ($r = –0.41$). For fathers, only the correlation between avoidant-focused coping and depression was significant ($r = .53$).

3.7.4. Relationship between coping and parenting stress

Two studies analyzed the correlation between coping and parenting style. Podolski and Nigg showed that parental coping in terms of f positive reframing (thinking about problems as challenges that might be overcome) was associated with lower distress for both mothers ($r = –0.34$, $p < 0.05$) and fathers ($r = –0.33$, $p < 0.05$). In contrast, use of community resources and social support was associated with greater parental distress, leading to a significant difference in the magnitude of the apparent impact on parental adjustment of these coping strategies (Podolski & Nigg, 2001). In a prospective longitudinal study, Zhu et al. showed that lower social support ($r = -0.08$; $p < 0.01$) and higher avoidance coping ($r = 0.11$; $p < 0.01$) from mothers may be related to the later development of ADHD symptoms and may regulate the association between prenatal stressful life events and ADHD symptoms in male offspring (Zhu et al., 2015).

3.7.5. Relationship between coping and parent/child factors

Among selected studies, only two studies reported the impact of parent and child factors on coping strategies used by parents. Bailey et al. investigated the impact of age, marital status, gender and comorbid conditions of the target child (Bailey et al., 1999) and found no significant differences in any of the four coping strategies based on maternal age, gender and marital status. The only statistically significant difference was that mothers of ADHD children and a comorbid condition used rational coping strategies more frequently than the comparison group ($p = 0.014$). After adjusting for the effects of child's conduct problems, child's age, paternal age, and paternal education, Keown and Woodward found that maternal ($p < 0.01$) and paternal coping ($p < 0.01$) continued to be significantly associated with preschool hyperactivity (Keown & Woodward, 2002).

3.7.6. Relationship between coping and use of medications in children

In addition to our inclusion criteria, we found that two studies explored the impact of psychostimulants on coping strategies. Tancred and Greeff showed that the use of medication played a vital role in controlling key symptoms of ADHD ($F = 2.69$; $p = 0.01$) and in the general coping ability of parents and the family as a whole (Tancred & Greeff, 2015). According to these authors, use of medication could be considered as a first step in helping parents cope with ADHD behaviors and pave the way for meaningful parenting practices. By contrast, Bailey reported no significant differences for any of the coping strategies based on the child's medication status (Bailey et al., 1999).

3.7.7. Coping strategies in mothers and fathers

Only two studies reported specific coping strategies used by mothers and fathers separately. Podolski and Nigg showed that use of positive reframing was associated with greater role satisfaction in both mothers and fathers (Podolski & Nigg, 2001). McKee et al. reported that maternal social support-seeking was negatively correlated with avoidant-focused coping ($r = –0.43$, $p < 0.01$) and positively correlated with adaptive-focused coping ($r = 0.48$, $p < 0.01$). For fathers, social support-seeking was related to adaptive-focused coping ($r = 0.54$, $p < 0.01$) as well as focusing on/venting of emotions ($r = 0.51$, $p < 0.01$). Avoidant-focused coping and adaptive-focused coping were inversely related for both mothers and fathers ($r = –0.32$, $p < 0.05$; and $r = –0.51$, $p < 0.01$, respectively), although the correlation for mothers did not quite reach significance. The focusing on/venting of emotions scale was not

significantly correlated with any of the other coping scales for mothers (McKee et al., 2004).

4. Discussion

This review was mainly aimed at exploring coping strategies used by parents/caregivers of ADHD children. The quality appraisal of the reviewed papers showed that they fulfilled most of the required criteria (i.e., relevance of the topic, methodological quality, and analysis of the results) and consequently, that their results were consistent.

The reviewed articles, which included parents of TD children, showed the impact of raising a child with ADHD on the use of coping strategies. Parents of ADHD children used more dysfunctional coping styles than parents of TD children (Bailey et al., 1999; Borden et al., 2016; Durukan et al., 2008; Keown & Woodward, 2002; Podolski & Nigg, 2001; Woodward et al., 1997; Woodward et al., 1998). The most commonly used strategy by parents of ADHD children seems to be avoidant-focused coping which involves cognitive and behavioral efforts oriented towards denying, minimizing, or otherwise avoiding dealing directly with stressful demands, and is closely linked to distress and depression (Holahan, Moos, Holahan, Brennan, & Schutte, 2005). Lazarus and Folkman's stress and coping theory suggests that avoidant cognitive strategies in response to stressful encounters are likely to result in maladaptive emotional outcomes (Lazarus & Folkman, 1984). According to this theory, parental avoidant coping in ADHD children appeared to be an ineffective long-term strategy for managing parenting stress. Avoidant-type strategies may keep parents involved in a cycle of self-blame, withdrawal, and internalized frustration, rather than freeing their energies for problem-solving that could lead to enhanced feelings of competence and a greater sense of control (Steeger, Gondoli, & Morrissey, 2013). Furthermore, the reviewed articles suggest that parental avoidant reactions to stress were part of a process that predicts increased parental depressive symptoms (Borden et al., 2016; Durukan et al., 2008; McKee et al., 2004).

In addition, two reviewed studies showed that mothers of ADHD children sought significantly more support and used more indirect means than mothers of TD children (Podolski & Nigg, 2001; Zhu et al., 2015). These findings suggest that lower social support might lead to greater difficulties and negative representations of children, with a higher level of parenting stress. With ADHD children, there is a far greater frequency of challenging and difficult behaviors compared to non-ADHD children. As coping with a child with ADHD can be a formidable and tiring process, using indirect resources, particularly support, to facilitate effective coping is a wise strategy. Previous authors have reported that social support-seeking is associated with lower levels of stress and better adjustment in parents of children with disabilities (Baqutayan, 2011). Podolski and Nigg found that mothers of more severely impaired externalizing ADHD children experience greater role distress and may also tend to activate more extensive coping efforts as a result of this, including seeking support from the community (Podolski & Nigg, 2001). Overall, reaching out to community resources may be a standard coping approach as a child's problems escalate, and community members (e.g., teachers) are more likely to become involved. Such interventions may be helpful for the child or the parent. These results are in agreement with Vernhet's systematic review showing that parents of children with ASD used more avoidance strategies and less social support-seeking strategies than those of TD (Vernhet et al., 2018). Taken together, these reviews point out that this NDD affects most parents in a negative way and indulgence in coping strategies like avoidant-type and low social support strategies may keep a parent involved in a cycle of self-blame, withdrawal, internalized frustration, and feelings of helplessness which increase parental stress and reduce psychological well-being. This is an important issue for future research. Indeed, further studies should compare coping strategies in parents of ADHD children with parents of children with other NDDs.

This review also investigated which tools were used to measure parental coping strategies. Nine studies evaluated coping strategies through standardized questionnaires, three studies used a semi-structured interview, one study used a subscale of a standardized questionnaire, and one study measured coping through a questionnaire constructed specifically for the study. This shows the lack of established gold standards for the evaluation of coping strategies used by parents of ADHD children, for two main reasons. First, differences in assessment methodologies (standardized questionnaires or semi-structured interviews) made it difficult to compare studies, suggesting that the concept of parental coping in ADHD does not sit well with a fixed structure. Second, the standardized questionnaires used in these studies investigated coping strategies experienced during a generic stress situation, and only the WCC-R and COPE evaluated coping strategies during the specific situation of raising a child with ADHD. Each of these measures defines coping skills in a different way. However, some overlapping coping strategies can be identified: problem-solving strategies are measured by COPE, CERQ and CCNES; emotion-focused strategies by COPE, WCC-R, CCNES; social support-seeking strategies by COPE, F-COPES and WCC-R; and strategies that involved avoidance are measured by COPE and TCSQ. Furthermore, our review indicates that studies using other valid tools to measure coping strategies during a specific situation, such as Coping Inventory for Stressful Situations (CISS) (Endler & Parker, 1999), Coping Strategy Indicator (CSI) (Amirkhan, 1990), Life Situation Inventory (LSI), Stress and Coping Process Questionnaire (SCPQ) (Perrez & Reicherts, 1992), have not been used with parents of ADHD children yet. To sum up, existing measures tapping coping strategies in parents of ADHD children are extremely heterogeneous from a theoretical-methodological point of view. Despite the scientific interest in the construct of coping, research on coping assessment is still problematic and controversial.

Our systematic review also highlights the relationships between coping strategies and sociodemographic factors. Among reviewed papers, only two studies reported coping strategies used by mothers and fathers. Podolski and Nigg reported no differences between mothers and fathers of ADHD children (Podolski & Nigg, 2001). This is in contrast with previous studies, which suggested gender differences in the use of coping strategies by parents of children with others NDDs. The only difference between mothers and fathers of parents of ADHD children was reported by McKee's study: social support-seeking was negatively correlated with avoidant-focused coping and positively correlated with adaptive-focused coping for mothers. For fathers, social support-seeking was related to adaptive-focused coping as well as focusing on/venting of emotions. However, the proportion of fathers in our total review sample

was too limited to analyze coping strategy differences across gender. Further research with a larger father's population is needed.

Only two studies reported the impact of parent and child factors on coping strategies used by parents. These studies found no significant differences in coping strategies based on maternal age, gender and marital status (Bailey et al., 1999; Keown & Woodward, 2002). However, Bailey et al. found that mothers of children with ADHD and a comorbid condition used rational coping strategies more frequently than the comparison group, which suggests that the difficulty of managing children with ADHD is exacerbated by comorbid conditions. It is also interesting to note that mothers made a greater use of rational and planful coping strategies with children with additional problems. The complexity of the situation, together with an enhanced empathic response due to additional difficulties, may have encouraged a less aggressive and confrontational coping style. A more detailed investigation of the additional demand on coping resources as a result of comorbid conditions according to their severity, would be a very valuable contribution to the literature on coping and parenting.

Our systematic review also highlights the relationships between parental coping strategies and other parental outcomes measured with different questionnaires. Results are consistent with studies on other NDDs, suggesting that the use of adaptive coping strategies correlate with a higher familial quality of life, while maladaptive coping strategies show an inverse relationship (Predescu & Şipoş, 2013). In addition, Cappe et al. demonstrated that use of emotion-focused coping strategies is a significant predictor of adaptive difficulties (Cappe et al., 2017): behavioral disorders in children with ADHD – and the resulting conflicting relationships – increase parental stress and lead to inappropriate coping strategies. Moreover, hyperactivity index, stress ratings relative to perceiving the situation as a threat or a loss, and application of emotion-focused coping strategies were predictive of a poorer quality of life. In addition, studies investigating associations between coping strategies and parenting stress suggested that parental coping characterized by a greater use of positive reframing was associated with greater role satisfaction and lower parental stress for both mothers and fathers (Podolski & Nigg, 2001). Future studies on the association between coping strategies and parental stress are therefore recommended.

Finally, our review highlights the paucity of published studies on parental coping strategies in children with different predominant subtype symptoms (predominant inattention, hyperactivity/impulsivity, or combined symptom clusters) or based on ADHD symptom severity. Two reviewed studies specified the type of predominant symptoms in children with ADHD (Durukan et al., 2008; Podolski & Nigg, 2001) but did not provide data about differences in parental coping strategies based on ADHD subtypes. By contrast, Cappe et al. showed that severity of ADHD symptoms increases parental stress and use of inappropriate coping strategies by parents (Cappe et al., 2017). This would be a fruitful area for further research, in order to establish whether parental coping strategies vary according to ADHD subtypes or severity of the disorder.

Certain methodological limitations inherent in this review should be noted. First of all, several studies had relatively small samples and different studies controlled for different variables. Moreover, comorbidities between ADHD and other NDDs such as conduct disorders, ASD, and behavioral problems were frequently reported, and this could not be fully appraised within each study. The impact of these comorbidities will need to be explored in future studies.

There is also a clear lack of information on follow-up assessments and transfer and generalization effects of parent training on coping strategies. Ideally, intervention programs should include follow-up assessments, but not all studies included follow-ups and others emphasized the need for longer-term intervals.

In terms of methodologies, different (qualitative and quantitative) research designs were applied. We specifically excluded qualitative studies, although they do contribute greatly to the literature in this field, because their findings cannot be extended to wider populations with the same degree of certainty as quantitative analyses.

5. Conclusion

Our review shows that parents of ADHD children used more dysfunctional coping styles than those of TD children. The most widely used strategy by parents of ADHD children seems to be avoidant-focused coping and social support-seeking. Thus, in their intervention efforts healthcare professionals need to promote positive coping strategies helping parents identify people who can support them, either within their family or through an association or professionals. Parents of ADHD children should specifically be screened for coping strategies; however, future psychometric studies are needed to promote the development of suitable measures specifically tapping coping and the efficiency of coping resources to achieve positive emotional and well-being outcomes in parents of ADHD children. This review highlighted a lack of robust empirical evidence on the effect of sociodemographic factors and parent training programs on parental coping strategies. Coping assessment should be geared to identify effective strategies that reduce adverse reactions to stressful life events. Ideally, an implementation of positive coping strategies might not only lead to a reduction in adverse outcomes but also actually promote a sense of mastery for parents of ADHD children. Contrary to the negative therapeutic implications of parental stress assessment, effective, trainable coping strategies have positive implications for therapy, as they can be taught and added to the individual's repertoire. If effective coping strategies are leveraged to promote personal growth and satisfaction, parents will abandon an excessive use of ineffective, and perhaps habitual, unproductive styles.

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Transitioning youth to adult age also through health services

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The developmental transition epoch of late adolescence to early adulthood is a time of evolution (Chan *et al.*, 2019). Transition is not synonymous with transfer. Transition is an active action, collegiate and participated. Transfer is a passive action – a suffered one. Transition is the process of preparation for the transfer between paediatric and adult age, and it can also happen for the passage between health services. Transition includes the initial planning, the transfer itself and the support provided throughout, including the support provided in adult care (Schor, 2015). Transition should be a purposeful and planned process provided as a core component of developmentally appropriate health care for all young people with chronic diseases during adolescence and young adulthood (Tuchman *et al.*, 2008; Hepburn *et al.*, 2015). Unfortunately, only about half of adolescents and young adults with chronic diseases receive any preparation for this transfer of healthcare (Reiss *et al.*, 2005), despite the fact that significant determinants influencing gaps in care for adolescents with complex chronic conditions transitioning to adulthood have been identified (Goossens *et al.*, 2016). Transition to adult services is a risky period that can lead to reduced engagement with health care, and preventing adolescents from becoming lost in the transfer is one of the challenges (Willis and McDonagh, 2017; Nguyen *et al.*, 2018). These challenges are compounded by both multiple, concurrent developmental transitions that may be underway (i.e., shift to independent living, post-secondary education or the workforce and personal and peer relationships/social networks) and a lack of continuity of care into adult services (Suris and Akre, 2015). To complicate things further is the WHO's definition of young people (10–24 years old), increasingly used to reflect the protracted nature of transition as well as the biopsychosocial stages of development (Schor, 2015; Ki-moon, 2016). This, in turn, raises the issue of whether the challenges of transition are more closely related to adolescent and young adult development rather than to the professional handover of care (McManus *et al.*, 2015; Leyenaar *et al.*, 2017).

Despite the increased interest over the past decade, this issue is addressed by only a few countries (USA, UK and Canada) and is contemplated for specific chronic conditions (diabetes and spina bifida) and with interventions of low documented evidence (Mora *et al.*, 2019). Although there has been abundant literature outlining agreed principles of good transitional care, also incorporated into guidelines, the effectiveness has so far been scarce (Nagra *et al.*, 2015).

Studies evaluating chronic conditions identified various factors involved in a successful transition, including the importance of continuity and relationships with familiar health professionals and better information and involvement in care management. Studies exploring this issue show that there are often differences between user, parent and clinician perspectives (Reiss *et al.*, 2005). The transition to adult services often results in poor patient and parent satisfaction and loss to follow-up for young adults with chronic diseases. (Leyenaar *et al.*, 2017; Chu *et al.*, 2015; Suris *et al.*, 2017). The experiences of young people, parents and clinicians suggest joint-working as a frequent, shared need, given the reported lack of two-way communication as a major impediment to a successful transition process. Moreover, flexibility concerning transition-age thresholds is seen as a key component of good transition by both patients and parents. Studies evaluating parents' perspectives show that parents would like to be more involved in their child care as the child transitions to an adult service, and feel left out or feel they have no one with whom to discuss their worries about their children (Leyenaar *et al.*, 2017). This specific need could be related to the different cultural philosophies between child and adult systems, with the first being more family-oriented, inclusive and holistic than adult services, and the second being focused more exclusively on the individual (Davis *et al.*, 2014).

Unmet needs for youths moving from paediatric to adult services have been identified across disciplines (i.e., neurology, psychiatry, gastroenterology, rheumatology, pneumology) underling that differences in managing the care and in-service organisation, both between and within countries, accentuate the problems (Benchimol *et al.*, 2011; Srivastava *et al.*, 2012; Stagi *et al.*, 2015; Andrade *et al.*, 2017; Mori, 2018). Moreover, chronic disorders belong to a set of comorbidities that can also affect the transition between health services (Van Cleave *et al.*, 2013). Thus, although certain programmes have shown positive results within one or a few centres, or in interventional research, their feasibility in daily practice and their adoption at

national levels have yet to be defined and reached. Efforts are therefore needed at different levels and should involve all pertinent figures, by relevance and responsibility, to ensure the seamless continuity of care. Supporting youth transitioning into adulthood through integrated and coordinated care is a pressing issue for many countries globally as it impacts research, clinical practice and policy. Thus, determining strategies and appropriate practices to optimise services for transitioning youth and young adults with chronic needs are a priority for healthcare systems.

The following essays offer constructive reflections on the transfer and/or transition of young people with mental disorders, in particular on the currently available evidence for the two most investigated conditions (Attention deficit hyperactivity disorder ADHD and Autism spectrum disorder ASD) in the mental health field. These two disorders differ from chronic conditions for their complexity, comorbidities, multimodal therapy and need for a broad range of services and/or support (Bennett *et al.*, 2018; Wilens *et al.*, 2018). They are disorders in which the grade of impairment may also affect the event of becoming autonomous to some extent, although this event is the goal of transition of all youths, both healthy and ill, and the expectation of all parents. These are reflections that cannot be exempted from consideration of the social and economic circumstances, the local health-care system and the cultural level of the community where the transition must happen (i.e., where it will be planned, sustained and accompanied) (Eilenberg *et al.*, 2019). Thus, transition can also be a determinant of health inequalities within and between countries where patients and parents are too often left alone and can become lost in transition. Consequently, permanent monitoring and implementation actions at local and national levels should be set up involving all the care providers. In addition, future research should focus on providing clear evidence on the effectiveness of transition interventions in all countries.

In the two following essays a few considerations and references are repeated. It would have been possible to edit the text in order to avoid duplication. Instead, the choice was to maintain the repetitions to emphasise the relationship of the two disorders, often as comorbidities, but also to underline possible common answers to these common needs. This, of course, is a reflection to be verified also in many other circumstances.

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Editorial

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Transitional care for young adults with ADHD: transforming potential upheaval into smooth progression

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Abstract

Increasing numbers of young adults need continued support for their attention deficit hyperactivity disorder (ADHD) beyond the age-boundary for children's services. The sparse literature on transition in general suggests patchy provision and huge gaps in transitional care, but also that young people with ADHD and other neurodevelopmental disorders fair particularly badly. Transition in health care coincides with many other important life-transitions while the difficulties associated with ADHD may make these challenges particularly hard to cope with. Parents or other advocates therefore often need to be involved, which can present problems in adult mental health services given that they tend to be less family oriented than children's services. Importantly, young people need help negotiating the transition from passive recipient of care to active self-management, and in building relationships with the adult team.

In addition to patchy provision of adult ADHD services, transition is currently hampered by poor understanding of ADHD as a long term condition and uncertain knowledge of what services are available among young people and parents as well as the clinicians working with them. Guidelines recommend, and more importantly young people want, access to psychosocial interventions as well as medication. However, available evidence suggests poor quality transitional care and adult services that are highly focused on medication.

Adult ADHD services need to undergo similar development to that experienced by Child and Adolescent Mental Health Services and community paediatrics over the last few decades. While we debate the relative merits of dedicated or specialist *v.* generic adult mental health services, for young adults with ADHD the training, experience and availability of professionals are more important than their qualifications or setting.

Attention deficit hyperactivity disorder (ADHD) is a common reason for attendance at Child and Adolescent Mental Health Services (CAMHS) or community paediatrics (Ford *et al.*, 2007). A meta-analysis of 41 population-based mental health surveys of children under the age of 18 years (*n*-87 742) estimated the prevalence to lie between 2.6 and 4.5% (Polanczyk *et al.*, 2015). A varying but small proportion of these children access services (Ford *et al.*, 2007), but rates of clinical diagnosis and prescriptions for stimulant medication in childhood have steadily increased during the last 40 years in many parts of the world as a result of better recognition and improved service provision (Coghill, 2017). While initially conceptualised as a disorder of childhood, 15% of those affected during childhood continue to meet full diagnostic criteria for ADHD into their mid-twenties, and a further 50% continue to struggle with impairment due to sub-clinical symptoms (Faraone *et al.*, 2006). The result is an expanding cohort of young adults who need access to treatment.

The sparse literature on transition between child and adult mental health services in general suggests that it is 'poorly planned, poorly executed and poorly experienced' (Singh *et al.*, 2010; Signorini *et al.*, 2018; Appleton *et al.*, 2019). Evidence suggests that those with neurodevelopmental conditions, such as ADHD are particularly likely *not* to transfer to adult services (Singh *et al.*, 2010; Buitelaar, 2017; Tatlow-Golden *et al.*, 2018; Appleton *et al.*, 2019). A little more than a decade after the need was formally recognised, this editorial describes what we know about transitional care among young adults with ADHD to identify progress and gaps (Nutt *et al.*, 2007).

Transition is a process

Adolescence involves major developmental changes and challenges, while transitions, even if ultimately positive, require a period of adaptation. Within the context of healthcare, the consensus is that transition should extend beyond the simple transfer of clinical responsibility with an aim to support a young person into a new life-stage in a way that optimises their health and function (Beresford, 2004). The timing of the transfer between child and adult services often coincides with other major life transitions, such as leaving education, starting work or moving

out of the parental home (Cleverley *et al*., 2018). Thus, young adults may be deprived of familiar support networks while facing increasing demands in several domains simultaneously (Singh *et al*., 2010; Signorini *et al*., 2018). The constellation of difficulties that comprises ADHD may be particularly salient to transition; reduced ability to organise and regulate the self, as well as the high levels of comorbidity seen in clinical populations makes coping with these changes especially challenging, while impaired function during this critical and rapid developmental period is particularly detrimental to health, educational, occupation and social outcomes (Young *et al*., 2016; Buitelaar, 2017; Janssens *et al*., in submission). National registry studies suggest that continued ADHD medication into early adulthood is associated with substantially reduced levels of suicidal behaviour (Chen *et al*., 2014), depression (Chang *et al*., 2016), substance misuse (Chang *et al*., 2014), road traffic accidents (Chang *et al*., 2017), convictions and violent reoffending (Lichtenstein and Larsson, 2013). Transitional care for the graduates of children's services with ADHD and ongoing clinical need is, therefore, extremely important.

At its simplest, optimum transition has been characterised by *planning, information transfer* between the referring and receiving teams, *joint working* and most importantly, *continuity of care* (Royal College of Paediatric and Child Health, 2003; Singh *et al*., 2010; NICE, 2016). There has been surprising little research on the outcomes of transition in general (and ADHD in particular), but a recent scoping review identified six core components that could be used to evaluate interventions to support transition (Cleverley *et al*., 2018). These were transitional policy, tracking and monitoring, transition readiness, transition planning, transfer of care and completion of transfer. Similarly, a systematic review of transition for young people with various long term conditions in paediatric services suggested that preparation should commence in early adolescence but outcomes were better if transition was completed later, with 18 years recommended as the ideal age (Yassee *et al*., 2019).

There are some common barriers to the transition process in health care, some of which are relatively simple to address. A systematic review of transition from paediatric to adult care across varied conditions in the United States of America identified the following issues; *changing relationships, accessing adult practitioners, gaining funding, negative beliefs about adult care, lack of knowledge about the transition process* and *lack of self-management skills* (Gray *et al*., 2018). Similarly, a follow up study of young people in the UK with diabetes, cerebral palsy or autistic spectrum conditions found *appropriate* parent involvement, promotion of *health self-efficacy* and *meeting the adult team* before transfer were strongly associated with better outcomes (Colver *et al*., 2018). *Parental involvement* was also a predictor of successful transition from CAMHS to adult mental health services in the TRACK study (Singh *et al*., 2010). The children's services and adult services (CATCh-uS) study focused on transition in ADHD, and included semi-structured interviews with three groups of young people (before and after transition; plus those who dropped out of children's services and re-entered adult mental health services after a year or more); as well as parents and clinicians from CAMHS, paediatrics, adult mental health services and primary care (Janssens *et al*., in submission). Analysis indicated *the pivotal role of parents as advocates*, and a need to *balance the young person's participation in treatment decisions with the need to protect their interests according to their developmental capacity*. Developmental capacity may be particularly likely to be out of step with chronological age given the core impairments of ADHD (Coghill, 2017; Eke *et al*., 2019*a*). Echoing earlier work (Colver *et al*., 2018; Gray *et al*., 2018), participants in the CATCh-uS study emphasised two competing issues; *how prepared* the young person is for transition, and their *ability to manage their ADHD themselves*. Both are potential therapeutic targets, and the evidence-base would suggest that preparation should commence in early adolescence to provide time to develop self-management skills (Yassee *et al*., 2019).

Disengagement may occur before the upper age-boundary for the service if transition is not discussed, which contrasts with current common practice in many children's services, where the literature indicates little differentiation in the approach to young children or adolescents and poor awareness of adult provision (Buitelaar, 2017; Price *et al*., 2018). The CATCh-uS study revealed that many young people and parents lacked understanding that ADHD may persist into adulthood as well the common perception that medication was related to coping with school (Janssens *et al*., in submission). These were commonly cited reasons for dropping out of healthcare and suggest a need to support young people to *develop greater awareness of the impact of ADHD on their lives* and strategies to manage it (Buitelaar, 2017). Indeed, current guidelines would recommend *reassessment at the point of transition* as part of transition planning, which could prompt such discussions (Kooij *et al*., 2010; Young *et al*., 2016).

ADHD and transition

There are also *condition specific barriers* to transition (Colver *et al*., 2018; Gray *et al*., 2018). For ADHD these are *lack of service provision, poor understanding or scepticism about ADHD* as a long term condition, and *insufficient knowledge* about the existence of adult ADHD services where these are available (Price *et al*., 2018; Janssens *et al*., in submission). In the CATCh-uS surveillance study, only 6% young adults with ADHD who needed and wanted to continue their ADHD medication experienced optimal transition at follow up; and only one fifth transferred successfully (Eke *et al*., 2019*a*). *Initial referral* (75% referred, 63% accepted) and *continuity of care after referral* (only 22% attended their first appointment at adult mental health services) were key weak points in the pathway, so should be targets for service improvement.

Lack of transitional service provision may lead to premature cessation of medication, inappropriate attendance by adults at children's services or discharge to primary care despite ongoing clinical need (Price *et al*., 2018; Tatlow-Golden *et al*., 2018; Janssens *et al*., in submission). Data from UK primary care suggest that even 5 years after national guidance recommended continued treatment for adults that require it, only 18% of young people prescribed medication for ADHD in their early teens continued to receive prescriptions beyond the age of 18 (NICE, 2008; Newlove-Delgado *et al*., 2019*a*). Of those who stopped their prescriptions, 7.6% had resumed them after the age of 20, and resumption was associated with referral to adult mental health services (Newlove-Delgado *et al*., 2019*b*). The process of re-accessing specialist mental health services was experienced as arduous, frustrating and lengthy (Price *et al*., 2018; Janssens *et al*., in submission).

We have very limited empirical evidence about how many young people require transition in relation to their ADHD, but that we have strongly suggests considerable under-provision. Prospective reports by consultant paediatricians and child psychiatrists across the United Kingdom and Southern Ireland suggest that between 270 and 599 per 100 000 17–19 year olds per

year needed transition (Eke *et al.*, 2019*a*). Given the increases in medication prescribing these figures should be expected to increase and will underestimate of the level of service provision required as inclusion in the study depended on needing and wanting continued medication. Many adults with ADHD want and could benefit from psychological support (Buitelaar, 2017; Coghill, 2017; NICE, 2018; Janssens *et al.*, in submission) while triangulating these reports against a secondary data source suggested a high likelihood of incomplete case ascertainment (Eke *et al.*, 2019*b*). These estimates should be taken as the lower limit of what is needed.

What should adult ADHD services provide?

The focus on medication to the exclusion of other types of intervention is problematic (Janssens *et al.*, in submission). Indeed, many of the factors highlighted that promote continuity of care involve education and the promotion of self-management. While many patients would welcome psychological support, practitioners report lacking the time or resources to deliver it (Janssens *et al.*, in submission). There is little evidence currently that psychological therapy is effective for ADHD in childhood, but relatively few robust studies have been undertaken with adolescents and adults (Buitelaar, 2017). Motivational interviewing, cognitive behavioural approaches and mindfulness-based techniques might assist young people to improve their self-awareness as well as organisational, problem solving and decision-making skills, but need empirically testing (Buitelarr, 2017). As Professor Buitelaar asserts, we might be able to engage and support young people with ADHD using smartphone apps or games, provided evaluation demonstrated their effectiveness. Programmes that tailor support to the individual and include education, occupation and social issues may be more successful than medication provision alone (Embrett *et al.*, 2016; Coghill, 2017). They could potentially be highly cost-effective, given the high rate of ADHD reported among prison populations (Young *et al.*, 2018).

The difference in culture between child centred services, where parental involvement is assumed, to adult oriented services where parents were not necessarily included, causes problems for young people in transition and their carers (Singh *et al.*, 2010; Price *et al.*, 2018; Janssens *et al.*, in submission). If parents are highly involved in supporting their child's access to health care, their exclusion from adult mental health services may lead to disengagement by default rather than intention (Colver *et al.*, 2018; Janssens *et al.*, in submission). There can, however, be tensions between the needs and wishes of the young adult and those of their carers, which all stakeholders need to negotiate carefully (Singh *et al.*, 2010; Colver *et al.*, 2018; Janssens *et al.*, in submission). The balance can, and indeed should, change between parent-child dyads over time, and the management of this process should, if necessary, be a therapeutic target. In addition, there is an obvious issue for services to consider in terms of advocacy for young adults without parental support, such as those leaving the care system.

Service organisation and transitional care models

Provision is strongly influenced by the historical development and funding processes (Crowley and Wolfe, 2013). Structural issues include the presence or absence of strong primary care, the availability of highly specialist centres of excellence, how specialist and primary care work together and whether primary and specialist care offer services for both adults and children, or physical and mental health. The extent to which health care is integrated with social and special educational services that many children with long term conditions need is also important (Crowley and Wolfe, 2013). The need for transition to adult services emerged with the shift from acute infections to chronic disease, while mental health services are particularly poorly resourced, and organised around episodes of care and severity (Crowley and Wolfe, 2013). There is huge variation in what is provided between and within countries, and whether the focus is restricted to 'core' mental health or broader needs (Certrano *et al.*, 2020). Furthermore, paediatrics, CAMHS and adult mental health services are rarely all financed and administered within the same organisation, while training for professionals who work with children and adults often diverges at an early point. The resulting knowledge and cultural gaps combined with fragmentation of organisation, skills and knowledge-base as well as resources undermine collaborative working, which is essential to optimise transition (Coghill, 2017; Cortese and Barbui, 2017; Janssens *et al.*, in submission). Stigma related to ADHD and adult mental health services may deter some young adults from transition (Young *et al.*, 2016), which may be particularly salient for those initially treated within paediatrics as children. Indeed a lower proportion of young people transferred successfully from paediatric services than from CAMHS in the CATCh-uS surveillance study (Eke *et al.*, 2019*a*). Moreover, social concerns about peers' evaluations may be particularly acute for adolescents (Buitelaar, 2017); the level of concern and considerations about stigma and disclosure should be a topic of discussion as part of transition preparation.

There have been a flurry of concerns about the provision of mental health care for young people, as well as for adolescents with long term conditions across high income countries (Crowley and Wolfe, 2013; McGorry *et al.*, 2013). In Australia, 'Headspace' centres supplement traditional primary care for young people aged 12–25 years and offer easily accessible mental and physical health care, drug and alcohol services and access to vocational or educational advice as well as a public health remit that extends into schools and communities and includes on-line resources (McGorry *et al.*, 2013). These centres have strong links to secondary mental health care centres that also focus on young people, particularly those with emerging severe mental illness and personality disorder. Similarly, the 'Youthspace' programme in the city of Birmingham is one of several UK-based examples of youth services that aim to provide easy access to specialist mental health care for young adults up to the age of 25; it includes a dedicated team for transition and specific consideration of ADHD (McGorry *et al.*, 2013). While moving the upper age boundary to 25 avoids a break in provision at the maximal incidence for psychosis, eating disorders and personality disorder, it may merely postpone difficulties with transition for those with ADHD if the capacity of adult mental health services to work with this condition is not improved.

A systematic review identified three distinct but not mutually exclusive models of transitional care, all originating from the United States of America, as well as a lack of evidence to support their application (Nguyen *et al.*, 2017). The framework for understanding mental health service utilisation classifies young people by their current needs and previous service use patterns to suggest a personalised approach to future care. The transition to independence model advocates for a transition worker to support individuals to plan their future care in relation to their needs. This is similar to the Transition Service Integration model, which incorporates the service context as well as individual

needs to support future function. All models stress the need for broader services than mental health alone, and highlighted particular gaps in relation to sexuality, finance, environment and culture. We need evaluations of different models in a variety of locations to guide us as to which model is most effective in which context.

Despite the lack of evidence to support particular models of care in ADHD (Cortese and Barbui, 2017), there is much debate amongst stakeholders whether care for adults with ADHD can be adequately provided within *generic adult mental health services* or whether *dedicated specialist* services are preferable. There is also debate about *what constitutes a specialist service*? A Delphi study conducted about this issue in relation to eating disorders that concluded specialist services provide evidence-based interventions, must be multi-disciplinary, and staff working within the service must have a clear focus on, and expertise in, the focus condition (Petkova *et al.*, in revision). The number of cases managed was also considered important but consensus was not achieved on how many were required to signify specialist expertise. An economic evaluation of specialist *v.* generic eating disorder services for young people suggested that specialist services did not produce better outcomes but as they worked with young people who had more severe difficulties, they were cost-effective depending on willingness to pay (Byford *et al.*, 2019). It is intuitively plausible that a combination of regional highly specialist services to provide training, consultation and direct work with those with complex difficulties could compliment more widespread support in generic adult mental health teams, but proper evaluation is as desperately needed.

Adult ADHD services need to undergo similar development to that experienced by CAMHS and community paediatrics over the last three decades (Coghill, 2017). Clinical guidelines state that the following provision should be available for adults with ADHD: *transitional care, assessment and diagnostic services, drug titration, monitoring and review, and psychoeducation* (Nutt *et al.*, 2007; Kooij *et al.*, 2010; NICE, 2016, 2018; Young *et al.*, 2016). Yet the research literature demonstrates that service provision remains highly variable between and within different countries, and that very few of those who need ongoing care for their ADHD make the transition to adult services, let alone experience anything that approaches optimal transitional care (Coghill, 2017; Eke *et al.*, 2019*a*; Janssens *et al.*, in submission).

We should be reassured that the epidemiological evidence points to continued under-recognition and under-treatment of children and young people in many countries (Ford *et al.*, 2007; Coghill, 2017; Wang *et al.*, 2017; Mandalia *et al.*, 2018). But this also means that recent increases in the number of children prescribed ADHD related medication may continue and will logically be followed by an *increase* in the number of young adults who should transition. Service providers and commissioners should plan accordingly. As Professor Coghill argues, the training, experience and availability of professionals are more important than their qualifications or setting, but given how complex and variable the manifestations of ADHD can be, management by primary care without the support of specialist services may miss important comorbidities, even in 'uncomplicated cases' (Coghill, 2017). What is important for young adults and their carers is access to services that understand their condition and support to them to manage it, rather than where or by whom they are seen (Janssens *et al.*, in submission). There is a desperate need for improved transitional and adult ADHD service provision, and now clear signals from research about what would improve continuity of care into adulthood; it is up to us all to implement and evaluate them.

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How should we support young people with ASD and mental health problems as they navigate the transition to adult life including access to adult healthcare services

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Editorial

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Abstract

For young people with autism spectrum disorder (ASD), the transition from childhood to adulthood especially for those with additional mental health problems can be challenging. Increasing numbers of young people attending child and adolescent mental health services (CAMHS) have a recognised diagnosis of ASD. What are the outcomes of these young people when they are discharged from CAMHS and how best can services support their needs? In this editorial we consider the emerging literature on transition for young people with long-term conditions and in particular those with ASD. Longer term studies suggest that the outcomes for individuals with ASD across the ability range is mostly poor and that healthcare transfer has generally not been managed well, with service users often reporting a lack of appropriate types of support. Encouragingly there is an increasing awareness of the need to support young people with long-term conditions as they negotiate the many developmental tasks of transition to adulthood. However, less is known about the experiences and aspirations of autistic individuals of all abilities as they transition to adulthood. This knowledge can inform a more nuanced approach to identifying developmentally appropriate outcomes. Recent studies with cognitively able young people with ASD, highlight some features in common with young people with long-term conditions but also the importance of identifying ways to foster underlying skills and the ability of young people with ASD to develop and maintain relationships. Child-focussed and adult-orientated healthcare services need to work directly with autistic individuals and their support networks to facilitate successful engagement with services and enable adults to manage their mental health needs. There is an urgent need to investigate the implementation and effectiveness of research and clinical guideline recommendations that aim to increase wellbeing, health self-efficacy and improve the mental health outcomes for autistic adults.

Introduction

Approximately 1% of the population (Williams *et al.*, 2006; Elsabbagh *et al.*, 2012) have a diagnosis of autism spectrum disorder (ASD). ASD in both childhood and adulthood is characterised by a spectrum of skills and needs, including impairments in social communication, and the presence of restricted and repetitive behaviours and interests (American Psychiatric Association, 2013). In addition, many individuals also meet criteria for co-occurring psychiatric conditions at a significantly higher rate compared to non-autistic populations (Simonoff *et al.*, 2013). The conditions include attention deficit hyperactivity disorder (ADHD), anxiety and emotional disorders, and oppositional defiant disorder (Billstedt *et al.*, 2005; Leyfer *et al.*, 2006; Simonoff *et al.*, 2013; Lever and Geurts, 2016). Not all individuals with ASD are diagnosed in childhood. Some individuals present to adult mental health services (AMHS) for an ASD diagnostic assessment, often with co-occurring physical and mental health needs (Brugha *et al.*, 2012). There is an increasing recognition that primary health care (family practitioner) and community mental health services require the relevant expertise and resources to provide diagnostic assessment and intervention services appropriate for individuals of all ages presenting with a definite or suspected ASD diagnosis (Department of Health, 2015).

Transition

Transition from childhood to adulthood is a period of development characterised by significant change of both the brain and behaviour (Colver and Longwell, 2013). The developmental tasks include leaving school, moving to post-secondary education or employment, gaining autonomy and independent living skills, and developing adult friendships and intimate

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relationships. The timescales vary, but the implication for services is that transition extends from approximately 16–24 years (Colver *et al.*, 2018, 2019).

Definitions for healthcare services

'Transition' refers to the purposeful, planned process that addresses the needs of young people in a holistic way as they move from child-centred to adult-oriented health care systems (Blum *et al.*, 1993). In contrast, a 'transfer' is the singular event when medical care of a young person is moved from children's to adults' services. For example, the transfer from child and adolescent mental health services (CAMHS) to AMHS in the UK occurs at the age of 18 years (range 16–18 years).

Transition experiences for young people with long-term conditions

Unfortunately, for many young people with long-term conditions during transition their health may deteriorate and social participation reduce. Studies of young adults with a range of disorders have demonstrated delays in autonomy, psychosexual and social development (Pinquart, 2014). These problems have been recognised internationally (NICE, 2016; Mazur *et al.*, 2017; White *et al.*, 2018). Publications highlight the importance of early planning, continuity of care and the need to consider developmental needs rather than simply defining an age cut-off healthcare transfer. The UK National Institute for Health and Care Excellence (NICE) guidelines recommend that: transition support must be developmentally appropriate and person-centred; young people should have a named worker and meet the adult team before transfer; support for building independence and appropriate involvement of parents/carers (NICE, 2016).

The evidence base supporting recommendations has been limited. A recently completed 5-year programme of applied health research on transition has attempted to address this knowledge gap. The programme included a 3-year longitudinal study of 374 young people with long-term conditions (diabetes, cerebral palsy and ASD with additional mental health problem) using generic outcomes such as subjective wellbeing, participation, satisfaction with services and condition-specific measures of disease control (Colver *et al.*, 2019). Three features of transitional healthcare were associated with improved outcomes: appropriate parent/carer involvement (defined jointly by the young person and parent); promotion of health self-efficacy and meeting the adult team before transfer. Only 1/3 of young people across all groups experienced appropriate parental involvement; 1/4 of young people with ASD reported experiencing support with health self-efficacy and only a 1/4 had met the adult team (similar findings for young people with cerebral palsy) compared with two-thirds of young people with diabetes. The generalisability of these findings is limited as the sample was relatively young (17–21 years at final follow-up) and all were considered by their referring clinicians to be of average intellectual ability. However, the findings do provide sufficient evidence to support the urgent need to investigate how best to implement these relatively straightforward features of transitional healthcare. Other findings highlight the importance of organisation-wide training in 'developmentally appropriate healthcare'; and the need for transitional healthcare to be funded and organised across child and adult healthcare providers, working in close partnership with primary care and community services. Implementation of these recommendations requires careful co-ordination within and between services – a definite challenge for existing funding organisations and service providers. The programme also included an exploration with young people of their attitudes to transition. Four broad approaches were identified: 'laid-back', 'anxious', 'wanting to be in control' and 'socially-oriented'. These findings emphasise the need to individualise transition planning for each young person including consideration of their communication needs and skills.

What are the transition experiences of young people who attend CAMHS?

Most young people with mental health problems in England and Wales attending CAMHS are discharged to primary care services rather than being referred to AMHS (Singh *et al.*, 2010). For some, transfer of healthcare to primary care will be a positive and appropriate experience. For others, their mental health problems do not suddenly change, they cannot access an ongoing mental health service and experience a discontinuity of care provision (NICE, 2016). Accessing AMHS requires the young person to have an 'enduring mental health problem' (Singh *et al.*, 2008). There is evidence from the UK Transition of Care from CAMHS to AMHS (TRACK) study that some young people with a range of mental health problems, including ASD, ADHD, emotional disorders and emerging personality disorders, have limited access to AMHS (Singh *et al.*, 2010; Paul *et al.*, 2013).

In a secondary analysis of the TRACK data, Islam *et al.* (2016) studied a subsample of 64 young people with ongoing mental health needs (just over a third of the original cohort) who were not transferred to AMHS. Twenty-three percent of this sample had a neurodevelopmental disorder. Whilst 11% were unsuccessfully referred, the majority had NOT been referred. A small proportion of cases were referred to other services, usually together with a referral to primary care. Over half of those who were not transferred to AMHS remained open to CAMHS services beyond the age for transition. The most common reason for non-referral was refusal by the young people/carer or resolution of the clinical need. Other reasons included disengagement from CAMHS; an assumption that the young people's mental health needs would not meet AMHS criteria; AMHS perceived to not have the required expertise; or transfer was delayed because of unknown immigration status. This study highlights the risk that young people with ASD, and others, may fail to access secondary mental health services and/or other relevant support at a time of increased uncertainty and risk.

The longitudinal Transition study (Colver *et al.*, 2019) provided an opportunity to compare the experiences of young people with ASD attending CAMHS with those with diabetes and cerebral palsy. Healthcare transfer for 65% of young people with ASD was to primary care compared to over 90% of young people with diabetes who transferred to secondary adult healthcare services. At the beginning of the study young people and their parents (across all groups) were relatively satisfied with the services they were receiving. Over the course of the study the young people with cerebral palsy and with ASD became increasingly dissatisfied with services. Across all groups parents were usually more dissatisfied than young people (Colver *et al.*, 2018). Despite this, the wellbeing of young people with diabetes (measured by the Warwick-Edinburgh mental well-being scale; Clarke *et al.*, 2011) was within the average range for the general population. The scores for young people with cerebral palsy and ASD showed

significantly poorer wellbeing, which persisted throughout the follow-up period. The young people with ASD had the lowest wellbeing scores by the end of the study.

The condition specific outcome measure for the ASD sample was the Hospital Anxiety and Depression Scale (HADS) – a 14 item self-report questionnaire designed to measure mental health symptoms in the week prior to the research visit (Zigmond and Snaith, 1983). An initial validation study of older adolescents and young adults with ASD has shown excellent psychometric properties (Uljarević *et al.*, 2018). At each visit over the 3-years nearly 60% of young people had abnormal or borderline abnormal HADS anxiety scores.

A subsequent secondary analysis of outcome measures, follow-up visits and clinical notes was undertaken to investigate predictors of transfer to AMHS, and explore young peoples' experiences of transition (Colver *et al.*, 2019). A diagnosis of ADHD and taking medication were the best predictors of transfer to AMHS. A thematic analysis identified seven categories: concerns about ASD/developmental and adolescent issues; engagement; family involvement; access to support services, educational and post-schooling opportunities; impact of mental health and crisis including self-harm. Using the young person's HADS scores three mental health trajectories were identified: doing well; continuing moderate difficulty and not doing well. A number of features were identified amongst the young people with the most positive outcomes including successful engagement by the young person (and their family) with services (school counsellors, social services and mental health services). Compared with those who had poorer outcomes, the young people in the 'doing well' group had experienced relative stability in educational provision and family life. There was also evidence that the young people were gaining skills in social participation, learning to manage their mental health concerns, developing an awareness of the impact of their ASD and learning to negotiate, with support, some of the developmentally appropriate aspects of transition. However, the young people who had successfully moved on to university did not meet criteria for the 'doing well' trajectory. They reported struggling to adjust to the challenging academic and social educational environments.

For some young people the discharge to primary care was not successful with crisis team involvement and time-limited support from AMHS before being discharged again. A common concern raised by families and young people was their perceived lack of support and 'unmet need' – much more common in the poorer outcome groups. These findings are in keeping with other research where young people of average ability are unable to access community learning disability, or other community specialist and mental health support. For all groups the importance of positive parent support was clear, with parents taking on roles co-ordinating support and in some cases providing employment opportunities. The poorer outcome groups were characterised by poor attendance and compliance with treatment, more significant impact of their ASD on progress, negative experiences with services leading to longer term disengagement, and young people not able to access services offered.

Difficulties faced by young people with ASD

Prior to transition some young people with ASD experience bullying in school, especially those with more severe impairments in social skills, additional mental health problems and parents/carers who have mental health problems (Cappadocia *et al.*, 2012). Following on from school, many face difficulties with low rates of post-secondary education and employment (Shattuck *et al.*, 2012). Indeed, young adults aged 19–26 with ASD without intellectual disability (ID) are more likely than those with ID to have no daytime activities (Taylor and Seltzer, 2011; Taylor *et al.*, 2015). Young people with ASD are reported to be less likely to be living independently (Howlin and Moss, 2012; Lake *et al.*, 2014), are socially isolated (Lounds Taylor *et al.*, 2017) and experience difficulties forming friendships and long-term relationships, including those who achieve a relatively high educational level (Hofvander *et al.*, 2009). Autistic adults self-report high rates of loneliness (Hedley *et al.*, 2018) and the experience of social disconnectedness and feeling a burden on others (Pelton and Cassidy, 2017). All these factors are likely to contribute to the high rates of comorbid psychiatric diagnoses (Taylor and Seltzer, 2011).

However, the broader social and economic context for young adults is changing, especially in developed economies, with more instability and uncertainty (Arnett, 2007; Wyn, 2014). These factors may also contribute to the anxiety expressed by parents (Sosnowy *et al.*, 2018) and teachers (Elias *et al.*, 2019) about the futures for autistic adults. Recent studies reporting the direct experiences of cognitively able autistic young people and adults provide new insights into their ambitions and transitional experiences (Cribb *et al.*, 2019; Lambe *et al.*, 2019). In the Sosnowy *et al.* (2018) study, although young people with ASD had some similar/equivalent long-term goals (e.g. finding post-secondary education or employment and/or leaving home), they focussed more on the steps towards achieving an outcome and/or gaining developmental precursor skills (e.g. understanding about how to make decisions for themselves). Cribb *et al.*'s (2019) qualitative study identified a group of young people seen in childhood and interviewed 12 years later. The thematic analysis identified that the young people (at age 16–20 years) felt more in control of their own lives, needed to take one step at a time and valued their 'social connections with others'. These studies highlight the importance of the wider context for the young person and that acknowledging the pace of change is likely to promote wellbeing and a sense of self-identity. Minimising the impact of disruption of mental health provision or loss of support also appeared to promote continuation of underlying skills development and the ability of young people with ASD to make and maintain relationships.

In a mixed methods study Beresford *et al.* (2013) explored young people's and parents' experiences of transition planning and healthcare transfer. The lack of post-school options, especially amongst the cognitively able students ineligible for adult social care, and the lack of support caused greatest concern for parents and practitioners. For the authors, loss/interruption of mental health support at a time of change in so many areas of the young person's life appeared counter-intuitive. Cognitive ability was not an indicator of the degree in which the young person was able or willing to engage in planning and take on responsibility for moving forward towards adulthood. For many, involvement in planning was stressful and challenging. Further, the lack of daytime activities had a negative impact on wellbeing. Recommendations included the need for a 'coordinator' role to provide emotional support, anticipate preparatory skills and co-ordinate decision-making. Parents, not professionals, emerged as the most significant and valued source of support (Mitchell and Beresford, 2014).

How can we better support young people with ASD through transition?

Young people with ASD have a wide range of skills and needs but as a group they can face multiple difficulties through childhood and into adulthood. These problems inevitably impact on achieving social independence. For autistic young people, individual functioning (including cognition, communication, independence and severity of ASD) is a strong predictor of outcome (Kirby *et al.*, 2016). However, new evidence supports the need to appreciate skill differences as well as deficits. Differences in cognitive functioning might include social processing strengths and constructing personally significant narrative constructs, through to gender differences in mentalising all factors relevant to social outcomes. Further, it is important to appreciate what a 'good outcome' means for each young person and whether traditional outcomes of transition are developmentally appropriate, especially when the pressure of striving to achieve such social outcomes in the absence of support from adult services may be detrimental to wellbeing. Intervention programmes for autistic adults that focus on an individual's ability to develop social networks and friendships, and their underlying skills including planning and decision making, have been reported to lead to greater confidence in accessing social support (Oswald *et al.*, 2018). These types of approaches may assist young people to manage their own health needs and learn how to navigate available service provision (health self-efficacy). However, most studies to date have not included young people with ID. Further research is needed to identify how best to appreciate the views and aspirations of this group.

There is an emerging evidence base that can inform healthcare funders and providers about the features of developmentally appropriate transitional care likely to be associated with improved outcomes for young people. This includes evidence about how best to organise commissioning (funding) and co-ordinate within and between agencies, including primary care, to improve transitional healthcare (Colver *et al.*, 2019). The next step is to identify the most effective and efficient ways to implement these recommendations to improve social outcomes (Kirby *et al.*, 2016; Maniatopoulos *et al.*, 2018).

For autistic individuals access to adult mental health and other community support services is patchy and inadequate. There are calls for the establishment of autism treatment pathways in mental health services (Ward and Russell, 2007; Southby and Robinson, 2017; Camm-Crosbie *et al.*, 2019). Although healthcare transfer is a single event, CAMHS and professionals in adult services need to support early preparation and planning with young people and their families to maximise opportunities for successful engagement with the young person, and work at an appropriate pace to develop their understanding of their own ASD and mental health needs. Being aware of the young person's immediate needs and reflecting positively on gains and achievements will help young people experience some control of their lives.

Using a regular self-report check such as the HADS may help young people, their families and the professionals supporting them, to identify the young person's trajectory, and the impact of individual and family life experience. This may promote discussion about ways to manage mental health needs that interfere with personal goals and achievements. Closer links between CAMHS, primary care and the emerging range of community adult mental health providers and other agencies is clearly necessary to reduce the risks that young people and families feel unsupported. For those young people and families who are overwhelmed by concerns about ASD, mental health problems and a sense that their needs are unmet, the risk is that they have a negative experience of transition, disengage with services, present in crisis and are unable to access any services and support offered to them. Perhaps the use of a tool such as the HADS might help identify those individuals especially at risk of negative outcomes and crisis presentations. With the pressure on CAMHS resources, identifying and prioritising the needs of those young people at greatest risk of poor outcomes might be of benefit if it allows clinicians to support these young people to identify their own transition goals for participation and future social relationships before they disengage with services and/or are discharged from CAMHS.

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