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Framingham bv
Amalialaan 126 G
3743 KJ Baarn
The Netherlands
framingham@framingham.nl

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OUR PURPOSE
The Framingham series of publications is designed to meet clinical specialists’ need for a reliable guide to the most important articles appearing in their field. Each issue presents an authoritative selection from the recently published literature, with the emphasis on evidence-based medicine. Articles are recommended for inclusion by an advisory board headed by key opinion leaders in the relevant clinical area. Framingham’s team of medical writers prepares original abstracts of these articles, in a structured format that presents the main points at a glance. Our aim is to convey the essence of each article in a concise but readable style. Issues are published every three to four months.
BACKGROUND & AIM: Patients with attention-deficit/hyperactivity disorder (ADHD) often experience variations in their symptoms in different situations and at different times of the day, which is why long-acting medications are used for treatment; however, the clinical efficacy of these agents may vary over the course of a day. Atomoxetine (ATX) is a long-acting medication that has been shown to have efficacy through 24 hours, but its effect on executive function has only been assessed with questionnaires. The aim of this study was to evaluate the effect of ATX on ADHD symptoms at different times throughout the day, using a computer-based test and a motion-tracking device.

STUDY DESIGN: Multicentre, double-blind, randomized, placebo-controlled study.


METHOD: Children (age 6–12 years; 77.6% were boys) with ADHD were randomized to once-daily ATX (0.5 mg/kg a day for 1 week, and thereafter 1.2 mg/kg a day; n=63) or placebo (n=62), given in the morning, for 8 weeks. Patients were evaluated with the cb-CPT with infra-red motion tracking in the morning (before they took their medication), at midday, and in the late afternoon/early evening. The cb-CPT assessed 13 neuropsychological variables that reflect hyperactivity, inattention, or impulsivity. Patients were also assessed with the WREMB-R-Inv scale, which evaluates ADHD-related behavioural problems in the morning and evening.

RESULTS: Compared with the placebo group, patients in the ATX group showed significant improvements in hyperactivity, inattention, and impulsivity. The differences between the groups were seen throughout the day (morning, midday, and late afternoon/evening) for most of the variables assessed. Statistically significant differences between the ATX and placebo groups were also seen in the WREMB-R-Inv total score and subscores, in the ADHD-RS total score and inattention and hyperactivity/impulsivity subscores, and in the CGI-S score at week 8. Treatment-emergent side effects were reported in 50.8% of patients receiving ATX and in 43.5% of patients receiving placebo; 3.2% of patients receiving ATX and 4.8% receiving placebo dropped out because of adverse events. No serious adverse events were reported.

CONCLUSION: ATX was significantly superior to placebo in reducing symptoms of hyperactivity, inattention, and impulsivity throughout the day in children with ADHD.
BACKGROUND & AIM: Attention-deficit/hyperactivity disorder (ADHD) is thought to be caused by physiological and neural abnormalities affecting the regulation of behaviour. There is also evidence that emotional dysregulation is part of the condition, although it is not clear whether this is a secondary symptom or core feature, and whether positive or negative systems are most affected in ADHD. One way of investigating this is to measure changes in autonomic activity in response to emotional challenges, and the aim of this study was to assess parasympathetic and sympathetic nervous system reactivity in ADHD children performing a novel emotion task.

STUDY DESIGN: Controlled study.

ENDPOINTS: Parasympathetic and sympathetic nervous system activity.

METHOD: The study included 32 children with ADHD and 34 normally developing control children without ADHD. All were aged between 7 and 9 years in order to avoid confounding factors, such as adolescence and the potential emergence of other problems. ADHD was diagnosed according to DSM-IV criteria and agreed by two investigators. After washout (24–48 hours) of any stimulant medications, the children performed a validated emotion task in which they watched film clips designed to elicit negative or positive emotions, and were asked to facially mimic the emotion portrayed (induction) or to imagine the emotion but not to express it facially (suppression). Thus there were four conditions: negative induction, negative suppression, positive induction, and positive suppression of affect. Data from electrocardiography and impedance cardiography were used to measure the cardiac pre-injection period (PEP; sympathetic activity) and an index of respiratory sinus arrhythmia (RSA; parasympathetic activity).

RESULTS: Performing the emotion task had a significant effect on RSA in both ADHD and control children for each of the conditions. In children with ADHD, the level of parasympathetic activity was increased similarly from baseline across all task conditions, whereas in control children the level of parasympathetic activity was different depending on the type of emotion (increased for negative emotions and decreased for positive emotions) and task demands (increased more with suppression than with induction). In contrast, there were no differences in sympathetic activity (PEP) between ADHD and control children, and no overall effect of task condition on PEP.

CONCLUSION: ADHD in children would appear to be associated with changes to parasympathetic mechanisms involved in emotion regulation.
BACKGROUND & AIM: There are data to show that most adults with bipolar (BP)-I disorder had a disorder onset in childhood and adolescence, and that a third had symptoms before 12 years of age. Adults with early-onset BP disorder have clinical features very similar to those observed in children or adolescents with BP disorder, such as high rates of psychiatric comorbidity with attention-deficit/hyperactivity disorder (ADHD), antisocial and anxiety disorders, and high levels of functional impairment and mixed states. However, there is still controversy about the validity of paediatric BP disorder. The aim of this study was to investigate the course of paediatric BP-I disorder in individuals as they pass from childhood into adolescence.

STUDY DESIGN: Prospective, longitudinal, follow-up study.

ENDPOINT: BP-I status at 4-year follow-up.

METHOD: Seventy-eight children and adolescents (mean±SD age 10.5±3.2 years) with BP-I disorder were followed up for 4 years (mean age 13.4±3.9 years); the average duration of BP disorder at follow-up was 7.6±4.0 years. Structured diagnostic interviews, neuropsychological testing, and psychosocial, education, and treatment history assessments were used to evaluate the patients. At follow-up, patients were considered to have persistent BP-I disorder if they met the full criteria for DSM-IV BP-I disorder.

RESULTS: Fifty-seven patients (73%) who had BP-I disorder at study enrolment continued to meet the full diagnostic criteria for BP-I disorder at the 4-year follow-up. Persistence of BP-I disorder at follow-up was associated with a higher baseline use of stimulant medicines and with higher rates of major depression and disruptive behaviour disorders at follow-up. Of the remaining 21 patients who did not meet diagnostic criteria at follow-up, 6.4% (n=5) were in syndromatic and symptomatic remission (euthymic) and not receiving pharmacotherapy for the disorder, 6.4% (n=5) had persistent subthreshold BP-I disorder, 3.8% (n=3) had major depression, 1.3% (n=1) had subthreshold major depression, and 9.0% (n=7) were assessed as euthymic but receiving treatment for the disorder. Patients with non-persistent BP-I disorder also experienced high levels of dysfunction and morbidity.

CONCLUSIONS: Most children and adolescents with BP-I in this study continued to experience the disorder into mid- and late adolescence. While persistent BP-I was associated with high levels of morbidity and disability, persistent subthreshold BP disorder was also associated considerable dysfunction and morbidity.

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CONTROLLED COMPARISON OF FAMILY COGNITIVE BEHAVIORAL THERAPY AND PSYCHOEDUCATION/RELAXATION TRAINING FOR CHILD OBSESSIVE-COMPULSIVE DISORDER

BACKGROUND & AIM: Obsessive-compulsive disorder (OCD) is common in children and can be functionally debilitating in its severe forms. Evidence suggests that exposure-based cognitive-behavioural therapy (CBT) is effective in these children. The aim of this study was to compare the efficacy of exposure-based CBT plus a structured family intervention (FCBT) with that of psychoeducation plus relaxation training (PRT) in reducing symptom severity, functional impairment, and family accommodation (the extent to which relatives accommodate patient symptoms) in children with OCD.

STUDY DESIGN: Randomized controlled trial.

ENDPOINTS: Response; OCD severity; functional status; family accommodation.

METHOD: Children aged 8–17 years with primary OCD were randomized to 12 sessions of FCBT ($n=49$, 41 completed treatment) or PRT ($n=22$, 17 completed treatment) over 14 weeks. Positive responders completed 6-month follow-up assessments. Change in parameters over time was assessed using hierarchical linear modelling. Response to therapy, OCD severity, functional status, and family accommodation were measured with validated scales.

RESULTS: At week 14, the response rate was significantly higher in the FCBT group than in the PRT group overall (see Table). Moreover, there were greater reductions in OCD severity, child-reported functional impairment (both $p<0.05$), and symptom accommodation ($p=0.05$) in the FCBT group than in the PRT group over time, and more children in the FCBT group than in the PRT group achieved clinical remission. A reduction in family accommodation preceded improvements in OCD severity in both groups and in functional status in the FCBT group. Treatment gains were maintained at 6 months.

CONCLUSION: FCBT was more effective than PRT in reducing OCD severity, functional impairment, and family accommodation of symptoms in children, and improvements in family accommodation preceded changes in symptom severity and functional impairments.

Effect of psychoeducation plus relaxation training (PRT) or child cognitive behavioural therapy plus family intervention (FCBT) in children with obsessive-compulsive disorder

<table>
<thead>
<tr>
<th>Measure</th>
<th>PRT</th>
<th>FCBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response rate (%)</td>
<td>27.3</td>
<td>57.1</td>
</tr>
<tr>
<td>Disorder severity (score)</td>
<td>25.3</td>
<td>24.7</td>
</tr>
<tr>
<td>Baseline</td>
<td>17.2</td>
<td>13.3</td>
</tr>
<tr>
<td>Week 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family accommodation (score)</td>
<td>18.0</td>
<td>17.5</td>
</tr>
<tr>
<td>Baseline</td>
<td>15.2</td>
<td>9.3</td>
</tr>
<tr>
<td>Week 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional status (score)</td>
<td>14.9</td>
<td>13.4</td>
</tr>
<tr>
<td>Baseline</td>
<td>14.3</td>
<td>5.6</td>
</tr>
<tr>
<td>Week 14</td>
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<td></td>
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<tr>
<td>Clinical status (%)</td>
<td>17.6</td>
<td>42.5</td>
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<tr>
<td>Remitted</td>
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<tr>
<td>Subclinical</td>
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<td>23.0</td>
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<tr>
<td>Moderately ill</td>
<td>29.4</td>
<td>25.0</td>
</tr>
<tr>
<td>Severely ill</td>
<td>23.5</td>
<td>7.5</td>
</tr>
</tbody>
</table>

http://www.jaacap.org
BACKGROUND & AIM: Most children with attention-deficit/hyperactivity disorder (ADHD) have problems functioning socially, and parents and teachers report that they are typically less popular, less cooperative, more disruptive, and have poorer social skills than their peers. There is strong evidence that these problems are due to children failing to use their knowledge of the rules of social engagement when interacting with others (as opposed to not having that knowledge). Working memory is impaired in ADHD and may influence social problems by affecting children’s ability to store and recall information about social functioning or by influencing inattentive and hyperactive behaviours. The aim of this study was to investigate the impact of working memory deficits on social problems in children with ADHD.

STUDY DESIGN: Cohort study.

ENDPOINTS: Working memory; social functioning.

METHOD: The study included 39 boys aged 8–12 years, of whom 23 met criteria for a diagnosis of combined-type ADHD and had scores at least two standard deviations above the mean on parent and teacher-rated scales; the other 16 boys were developing normally and had no evidence of a clinical disorder. Each child was administered four phonological and four visuospatial working memory tasks, which consisted of recalling a series of jumbled letters and numbers in a specified order, or indicating the positions of dots appearing sequentially on an onscreen grid. Social problems were assessed using the Social Problems subscales of the Child Behavior Checklist and Teacher Report Form, which include items on peer rejection and its impact, social interaction style, and related behaviours. The impact of working memory deficits on social problems was assessed using bootstrapped, bias-corrected mediation analyses.

RESULTS: Of the three components of working memory (central executive, phonological storage/rehearsal, visuospatial storage/rehearsal), only the domain-general central executive had a direct effect on social problems, although the central executive also had an indirect effect on social problems via its impact on symptoms of ADHD. The phonological storage/rehearsal component of working memory affected social problems indirectly through its influence on hyperactive/impulsive behaviour, while the visuospatial component exerted an effect via an influence on inattentive behaviours.

CONCLUSION: Social problems in ADHD would appear to be largely due to children being unable to focus on information held in their working memory while simultaneously paying attention to multiple events and social cues in their environment.
BACKGROUND & AIM: Several studies have shown that the omega-3 fatty acid composition of plasma and erythrocyte membranes is different in children with attention-deficit/hyperactivity disorder (ADHD) from that in unaffected control children. Omega-3 fatty acid supplementation can alter the membrane fluidity of cells, which in turn could affect serotonin and dopamine neurotransmission, especially in the frontal cortex. The aim of this meta-analysis was to investigate the efficacy of omega-3 fatty acid supplementation in ADHD.

STUDY DESIGN: Review and meta-analysis.

ENDPOINT: ADHD severity.

METHOD: A search of PubMed and relevant reference lists identified ten randomized, placebo-controlled trials investigating the effects of omega-3 fatty acid supplementation in children with symptoms of ADHD (n=699), and which used a validated rating scale to measure ADHD severity. Preferred rating scales included the ADHD Rating Scale, the Conner’s Rating Scales for Teachers or Parents, and the Disruptive Behavior Disorder Rating Scale. The standard mean difference (SMD) was calculated by pooling the results of each study, and meta-analysis was performed using a fixed-effects model. In addition, publication bias and heterogeneity of treatment response were also assessed. Secondary analyses looked at symptoms of inattention and hyperactivity/impulsivity separately.

RESULTS: Overall, omega-3 fatty acid supplementation caused a small but significant improvement in ADHD symptoms (SMD 0.31, 95% confidence interval 0.16–0.47, \(p<0.0001\)). There was no evidence of publication bias or significant heterogeneity between studies. Similar effect sizes were seen when inattentive and hyperactivity symptoms were analysed separately (SMD 0.29, 95% CI 0.07–0.50, \(p=0.009\); SMD 0.23, 95% CI 0.07–0.40, \(p=0.003\); respectively). Higher doses of eicosapentaenoic acid, but not of other omega-3 fatty acids, were associated with an increased efficacy in treating ADHD symptoms (\(r^2=0.37, p=0.04\)). There was no significant difference in efficacy when omega-3 fatty acid supplementation was given as monotherapy (SMD 0.33, 95% CI 0.17–0.50; \(p<0.0001\)) or in combination with traditional ADHD medications (SMD 0.18, 95% CI –0.25 to 0.60; \(p=0.41\)).

CONCLUSIONS: Omega-3 fatty acid supplementation (particularly high doses of eicosapentaenoic acid) had a modest but significant beneficial effect on ADHD symptoms. Given its mild side-effect profile, omega-3 fatty acid supplementation may be useful to augment other pharmacological interventions.
BACKGROUND & AIM: Attention-deficit/hyperactivity disorder (ADHD) is common in individuals with substance use disorders, but is often untreated and is associated with poor treatment outcomes. Doctors are often reluctant to prescribe psychostimulants because of uncertainty about their efficacy and safety in this population, although one previous trial has reported the benefits of pemoline on ADHD symptoms in substance-abusing young people. The aim of this study was to investigate the efficacy and safety of osmotic-release methylphenidate in adolescents with ADHD who were also receiving cognitive behavioural therapy (CBT) for substance use disorders.

STUDY DESIGN: Randomized, placebo-controlled trial.

ENDPOINTS: ADHD symptom severity; substance use.

METHOD: The study included 303 adolescents aged 13–18 years who met DSM-IV diagnostic criteria for both ADHD and at least one non-tobacco substance use disorder. None had any current or past psychotic disorder or bipolar disorder, or had received any psychotropic medications in the previous month. All participants received manual-standardized, individual CBT using motivational enhancement approaches throughout the trial, and were randomized to receive either osmotic-release methylphenidate or placebo. Methylphenidate was administered initially at a dose of 18 mg, titrated up to 72 mg (or highest dose tolerated) during the first 2 weeks. ADHD outcomes were assessed using the ADHD Rating Scale, while the self-reported number of days of drug/alcohol use in the previous 28 days was used to assess substance use.

RESULTS: The reduction in ADHD symptom severity score was similar in participants who received osmotic-release methylphenidate (−19.2, 95% confidence interval −17.1 to −21.2) and in those who received placebo (−21.2, 95% CI −19.1 to −23.2). Although there was a clinically significant decrease in substance use, there was no between-group difference (−5.7 days, 95% CI −7.4 to –4.0; −5.2 days, 95% CI −7.0 to −3.5, respectively). However, methylphenidate was associated with greater reductions in parent-rated ADHD scores at 8 weeks (mean difference 4.4, 95% CI 0.8–7.9) and 16 weeks (mean difference 6.9, 95% CI 2.9–10.9), and with more negative weekly urine drug screens (3.8 versus 2.8, p=0.04) compared with placebo.

CONCLUSION: Osmotic-release methylphenidate did not have a beneficial effect on primary ADHD or substance use outcomes in adolescents who were concurrently receiving CBT for substance use, but it did have a modest effect on some secondary outcomes.
BACKGROUND & AIMS: There is evidence that attention-deficit/hyperactivity disorder (ADHD) may be associated with dysregulated growth, but earlier studies involved samples of clinically referred ADHD patients and as such may have been subject to interpretation bias. The aims of this study were to determine the incidence of ADHD in children aged 6–12 years in the general French population and to evaluate whether ADHD is associated with growth dysregulation.

STUDY DESIGN: Population-based epidemiological study.

ENDPOINTS: ADHD; height; weight.

METHOD: A telephone survey was conducted among 7912 French households randomly selected from a database containing 18 million telephone numbers. Of 4186 eligible families with children aged 6–12 years, 1012 were recruited. The aim was to obtain a population sample with a profile that closely matched the demographic background of the French population. Telephone interviews were used to gather information about ADHD symptoms, family living situation, school performance of the child/children, sleep disturbance, eating habits, and any prior ADHD treatment. The height and weight of children were also recorded. ADHD was diagnosed on the basis of questions derived from the Kiddie-Schedule for Affective Disorders and Schizophrenia for School-Aged children updated with items addressing all DSM-IV criteria.

RESULTS: Of 536 parents who completed the interview, 26 had a child with ADHD, 103 had a child with some ADHD symptoms, and 407 had a child with no ADHD symptoms. Regression analyses showed that non-medicated younger children with ADHD were taller (effect: t(515)=26.3, p<0.001) and heavier (effect: t(518)=1.8, p=0.03) than children without ADHD (see Figure). Among older children, this effect was reversed and those with medication-naive ADHD tended to be shorter and lighter than children without ADHD. The association was stronger for weight than for height.

CONCLUSION: ADHD was associated with dysregulated growth in treatment-naive children.
EXTERNAL VALIDATION OF BIFACTOR MODEL OF ADHD:
EXPLAINING HETEROGENEITY IN PSYCHIATRIC COMORBIDITY, COGNITIVE CONTROL, AND PERSONALITY TRAIT PROFILES WITHIN DSM-IV ADHD


AUTHORS: Martel MM, Roberts B, Gremillion M, von Eye A, Nigg JT
CENTRES: Psychology Department, University of New Orleans, New Orleans, Louisiana; Psychology Department, Michigan State University, East Lansing, Michigan; and Psychiatry Department, Oregon Health and Science University, Portland, Oregon, USA

BACKGROUND & AIM: The heterogeneity of symptoms in children with attention-deficit/hyperactivity disorder (ADHD) led to the classification of three subtypes in DSM-IV: predominantly inattentive, predominantly hyperactive-impulsive, and combined. However, the validity of this approach has been questioned. An alternative approach is a bifactor model, which features a general factor of the disorder (ADHD) and two specific factors (inattention and hyperactivity-impulsivity) that capture variance. This model may allow for a more accurate and meaningful categorization of clinical heterogeneity. The aim of this study was to provide external validation of the bifactor model of ADHD.

STUDY DESIGN: Cohort study.

ENDPOINTS: Associations between general and specific factors of ADHD and behaviours, cognitive control, and personality traits.

METHOD: The study included 548 children (321 boys) aged 6–18 years diagnosed with ADHD (n=302), subthreshold ADHD (n=47), or no ADHD (n=199). A total of 161 children also had oppositional-defiant disorder, 19 had conduct disorder, and 41 had major depressive disorder. A comprehensive diagnostic procedure was completed for all participants. Bivariate correlations were calculated between ADHD latent factor scores (i.e., specific inattention, specific hyperactivity-impulsivity, and general ADHD) and child problem behaviours, cognitive control, and personality traits. The same correlations were repeated with inattentive, hyperactive-impulsive, and total ADHD symptom counts, as defined in DSM-IV.

RESULTS: The bifactor model-based ADHD groups exhibited a distinct profile of deficits in cognitive control. The specific inattention factor was associated with depression/withdrawal, slower performance on the cognitive task, introversion, agreeableness, and high reactive control. The specific hyperactivity-impulsivity factor was associated with rule-breaking/aggressive behaviour, social problems, errors during set-shifting, extraversion, disagreeableness, and low reactive control. On the basis of the bifactor model, overall cognitive speed was slower in the specific inattentive group, set-shifting was worse in the general ADHD + specific hyperactive-impulsive group, and response inhibition was worse (and response variability was higher) in the general ADHD and general ADHD + specific hyperactive-impulsive groups. The DSM-IV ADHD subtype comparison did not reveal such a differentiated profile of deficits of cognitive control.

CONCLUSION: The bifactor model explained the heterogeneity of ADHD better than did DSM-IV symptom counts or subtypes.

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CARDIOVASCULAR RISK OF STIMULANT TREATMENT IN PEDIATRIC ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER: UPDATE AND CLINICAL RECOMMENDATIONS

*Journal of the American Academy of Child & Adolescent Psychiatry, 2011 October; 50(10):978–90*

**AUTHORS:** Hammerness PG, Perrin JM, Shelley-Abrahamson R, Wilens TE  
**CENTRES:** Clinical and Research Programs in Pediatric Psychopharmacology and Adult ADHD, Massachusetts General Hospital, Boston, Massachusetts; Division of General Pediatrics, Massachusetts General Hospital for Children, Center for Child and Adolescent Health Policy, Massachusetts General Hospital, Boston, Massachusetts; and Harvard Medical School, Boston, Massachusetts, USA

**BACKGROUND & AIM:** There is extensive evidence supporting the use of pharmacotherapy in the treatment of children with attention-deficit/hyperactivity disorder (ADHD). Although reviews of the safety of such medications have generally been reassuring, there have been reports of serious adverse cardiovascular events following the use of sympathomimetic first-line stimulant medications. The aim of this review was to analyse the cardiovascular risk of therapeutic stimulant-class medications in children and adolescents with ADHD, focusing on literature published in the past 10 years.

**STUDY DESIGN:** Review.

**FINDINGS:** Overall, the results of controlled studies published in the past 10 years suggest that stimulant-class medications are associated with a mean increase in blood pressure of 5 mmHg or less and in heart rate of 10 beats/min or less, without changes in electrocardiographic parameters, in both healthy children and adolescents with ADHD. In general, the literature suggests that most elevated readings are sporadic and resolve during ongoing treatment. However, a proportion (5–15%) of children and adolescents may exhibit a greater increase in heart rate or blood pressure at a given assessment or may report a cardiovascular-type complaint during stimulant treatment. The data currently available suggest that these increases in heart rate and blood pressure are persistent, implying that tolerance to the cardiovascular effects of stimulants does not develop during chronic treatment. Moreover, the lack of a clear dose–response relationship means that decreasing the stimulant dose will not necessarily prevent or reverse these cardiovascular effects. Despite this, the incidence of serious cardiovascular events in children or adolescents receiving stimulant medication remains low and similar to that in children not receiving stimulant medication.

As most clinical studies of youths with ADHD were not specifically designed to examine the cardiovascular impact of stimulants, systematic and uniform reporting of changes in blood pressure and heart rate in patients might improve our understanding of the cardiovascular risk of stimulants. Current recommendations advise minimizing cardiovascular risk in children and adolescents with ADHD by assessing their risk (personal and family history of cardiovascular disease and risk factors) before starting treatment with a stimulant-class medication. Heart rate, blood pressure, and risk factors should be monitored regularly during treatment.

**CONCLUSIONS:** As the cardiovascular risk of stimulant-class medications in children and adolescents with ADHD remains to be established, doctors should screen all patients in order to minimize this risk. Long-term clinical safety trials are required.
BACKGROUND & AIM: The symptoms of autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD) overlap, and the two conditions often occur together. This phenotypic overlap is confirmed by evidence of shared genetic influences in autistic and ADHD-related symptoms, but it is not known how this relationship changes over time. Autistic traits are generally stable, whereas the expression of ADHD symptoms is more variable. The aim of this study was to investigate the longitudinal association between social-communication deficits and hyperactive-inattentive symptoms during childhood and adolescence in the general population.

STUDY DESIGN: Population-based study.

ENDPOINTS: Hyperactive-inattentive traits; autistic social-communication impairments.

METHOD: The study included 5383 children (2669 males) of white ethnicity who were participants in the Avon Longitudinal Study of Parents and Children (ALSPAC). All had a total IQ of at least 70 at 8 years of age, and were assessed several times between the ages of 4 and 17 years. Social-communication skills were measured using the 12-item Social Communication Disorder Checklist, which has a high sensitivity and specificity for autism, and mother-reported scores were obtained at 8, 11, 14, and 17 years of age. Hyperactive-inattentive traits were assessed using the Strengths and Difficulties Questionnaire, and scores were reported by the participants’ mothers at 4, 7, 8, 10, 12, 13, and 17 years of age. The trajectories of both traits were analysed using latent class growth analysis.

RESULTS: Two social-communication trait trajectories were identified: a persistently impaired group with a high probability of deficits in social reciprocity and verbal/non-verbal communication throughout development (10%) and a low-risk group. Four hyperactive-inattentive trait trajectories were identified: persistently impaired children with a high probability of hyperactive-inattentive symptoms (4%); children with an intermediate probability of expressing these symptoms (8%); children with a childhood-limited expression of hyperactive-inattentive symptoms (5%); and a low-risk group (83%). Autistic symptoms were more stable than ADHD traits, and most of the children with persistent hyperactive-inattentive symptoms also had persistent social-communication deficits, but not vice versa. Maternal smoking during the first trimester and teenage pregnancy predicted trajectories of persistent impairment.

CONCLUSION: Social-communication and hyperactive-inattentive traits, and their developmental trajectories, would appear to be inter-related in children and adolescents, and especially in children with persistent impairments.

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