Adult Attention Deficit Hyperactivity Disorder: An overview

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Disclosures

☑ None
Layout of the talk

- Myths and concerns about ADHD
- Historical context of ADHD
- Diagnosis
- Syndrome of profound correlations and consequences
- Treatment
Ritalin Gone Wrong
By L. ALAN SROUFE

THREE million children in this country take drugs for problems in focusing. Toward the end of last year, many of their parents were deeply alarmed because there was a shortage of drugs like Ritalin and Adderall that they considered absolutely essential to their children’s functioning.

But are these drugs really helping children? Should we really keep expanding the number of prescriptions filled?

In 30 years there has been a twentyfold increase in the consumption of drugs for attention-deficit disorder.
Keith Conners

Last words on ADHD from the father of the diagnosis

Allen Frances professor emeritus former chair, Bernard J Carroll professor emeritus former chair

Department of Psychiatry and Behavioral Science, Duke University, North Carolina, USA

☑ Over diagnosis in US: “a national disaster of dangerous proportions”
  • Aggressive marketing by pharmaceutical companies
  • Careless doctoring
  • Worried parents
  • Schoolroom chaos

➢ Inattention and hyperactivity occur in general public as traits on a spectrum with only severe end meeting the dx criteria

BMJ 2017:358:2253
Introduction

- Worldwide prevalence of ADHD in children is around 5% vs 11 to 16% in US
- 2/3rd of children have persistent ADHD symptoms as adults
- 15% retain full diagnosis of ADHD by age 25
- 50% in partial remission by age 25
- Prevalence of ADHD in Adults (18 years and above) is between 2.5 to 4.3%
- Male to Female ratio 5:1 in children
- Mean heritability is between 77 to 88%
- Altered structure and function of PFC, Basal Ganglia & Cerebellum
- Dopamine & Noradrenaline (Norepinephrine) implicated

History of ADHD

❖ Sir Alexander Crichton (1798)

*An enquiry into the Nature and Origin of Mental Derangement*

*Chapter 2: Attention and its Diseases (Page 203)*

“(inattention) when born with a person, it becomes evident at a very early period of life, and has a very bad effect, inasmuch as it renders him incapable of attending with constancy to any object of education.”

“When people are affected in this manner, they say they have the fidgets.”

“It generally diminishes with age”
History of ADHD

- Dr Heinrich Hoffman (1844)  
  *Book: “Struwwelpeter”*  
  *Story of Zappel Philipp (Fidgety Philip)*

- Sir George Frederic (1902)  
  *Defect of moral control*

- Franz Kramer and Hans Pollnow (1932)  
  *Hyperkinetic disease of infancy*

- Birch, Rapin (1964)  
  *Minimal brain dysfunction*

- DSM-II (1968)  
  *Hyperkinetic reaction of childhood*

- DSM-III (1980)  
  *Attention Deficit Disorder (ADD) with or without hyperactivity*

- DSM-III-R (1987)  
  *Attention Deficit Hyperactivity Disorder (ADHD)*
ADHD DSM 5 criteria

❖ Inattention (Criteria A1)
6 of more symptoms for at least 6 months
1. Often fails to give close attention to detail/careless mistakes
2. Often has difficulty sustaining attention on tasks or play
3. Often does not seem to listen when spoken to directly
4. Often does not follow through on instructions and fails to finish schoolwork, chores, duties
5. Often has difficulty organizing tasks and activities/poor time management/disorganized work
6. Often avoids/dislikes tasks that require sustained mental effort
7. Often loses things
8. Often distracted by extraneous stimuli
9. Often forgetful in daily activities

❖ Hyperactivity (Criteria A2)
6 or more symptoms for at least 6 months
1. Often fidgets
2. Often leaves seat in situations when remaining seated is expected
3. Often runs about or climbs in situations where it is inappropriate/for adolescents and adults-feel restless
4. Often unable to play or engage in leisure activities quietly
5. Is often on the go
6. Often talks excessively
7. Often blurts out answers before question has been completed
8. Often has difficulty waiting his/her turn
9. Often interrupts others (butts into conversations, activities)
ADHD DSM 5 criteria

❖ Other criteria
B. Several inattentive or hyperactive impulsive symptoms were present before the age of 12 years
C. Symptoms are present in 2 or more settings (home/school/work etc)
D. Clear evidence that symptoms interfere with social, academic or occupational functioning
E. Not caused by another psychiatric disorder

❖ Types
➢ ADHD Combined type (both A1 & A2 criteria met)
➢ Predominantly Inattentive
➢ Predominantly Hyperactive/Impulsive
ADHD (F90) ICD 10 criteria

G1 Inattention
(1) often fails to give close attention to details, or makes careless errors in school work, work or other activities.
(2) often fails to sustain attention in tasks or play activities.
(3) often appears not to listen to what is being said to him or her.
(4. often fails to follow through on instructions or to finish school work, chores, or duties in the workplace (not because of oppositional behaviour or failure to understand instructions).
(5) is often impaired in organising tasks and activities.
(6). often avoids or strongly dislikes tasks, such as homework, that require sustained mental effort.
(7) often loses things necessary for certain tasks and activities, such as school assignments, pencils, books, toys or tools.
(8) is often easily distracted by external stimuli.
(9) is often forgetful in the course of daily activities.

G2 Hyperactivity
(1) often fidgets with hands or feet or squirms on seat.
(2) leaves seat in classroom or in other situations in which remaining seated is expected.
(3) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, only feelings of restlessness may be present).
(4) is often unduly noisy in playing or has difficulty in engaging quietly in leisure activities.
(5) exhibits a persistent pattern of excessive motor activity that is not substantially modified by social context or demands.

G3 Impulsivity
(1) often blurts out answers before questions have been completed.
(2) often fails to wait in lines or await turns in games or group situations
(3) often interrupts or intrudes on others (e.g., butts into others’ conversations or games).
(4) Often talks excessively without appropriate response to social constraints.

G4
Onset of the disorder is no later than the age of 7 years.

G5 Pervasiveness

G6
The symptoms in G1 and G3 cause clinically significant distress or impairment in social, academic, or occupational functioning.

G7
The disorder does not meet the criteria for pervasive developmental disorders (F84.–), manic episode (F30.–), depressive episode (F32.–) or anxiety disorders (F41.–).
ADHD: Establishing a convincing diagnosis

Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist

Parent Name: 
Date: 

1. How often do you have trouble ignoring the fine details of a project once the challenge part has been done?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

2. How often do you have difficulty getting things in order when you have to do a task that requires organization?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

3. How often do you have problems remembering appointments or obligations?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

6. How often do you feel overly active and compelled to do things, like you were driven by a motor?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

7. How often do you make mistakes in things you have to work on being boring or difficult projects?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

8. How often do you have difficulty keeping your attention when you are doing boring or repetitive work?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

9. How often do you have difficulty concentrating on what people say to you, even when they are speaking to you directly?
   - Never
   - Rare
   - Sometimes
   - Often
   - Very Often

10. How often do you say or do things without thinking? (e.g., say things before you think about them, do things before you think about them)
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

How often do you feel frustrated by activity or noise around you?

12. How often do you count or do things repeatedly?
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

13. How often do you feel restless or fidgety?
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

14. How often do you have difficulty maintaining attention when you time yourself?
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

15. How often do you find yourself talking too much when you are social situations?
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

16. When you're in a conversation, how often do you find yourself thinking about the next thing you want to say while you're talking?
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

17. How often do you have difficulty making your turn in situations when turns taking is required?
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

18. How often do you interrupt others when you are busy?
    - Never
    - Rare
    - Sometimes
    - Often
    - Very Often

Clinician rated
Consequences: ADHD and Suicide

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. Probands With ADHD</th>
<th>No. Control Participants</th>
<th>OR (95% CI) Crude</th>
<th>Adjusted for SES</th>
<th>Adjusted for Psychiatric Comorbiditiesa</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attempted suicide</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>51,707</td>
<td>258,535</td>
<td>8.46 (8.07-8.87)</td>
<td>8.26 (7.87-8.66)</td>
<td>3.62 (3.29-3.98)</td>
</tr>
<tr>
<td>Male</td>
<td>36,102</td>
<td>180,510</td>
<td>7.12 (6.68-7.59)</td>
<td>6.88 (6.45-7.34)</td>
<td>2.93 (2.60-3.29)</td>
</tr>
<tr>
<td>Female</td>
<td>15,605</td>
<td>78,025</td>
<td>10.39 (9.67-11.15)</td>
<td>10.22 (9.51-10.98)</td>
<td>5.41 (4.60-6.36)</td>
</tr>
<tr>
<td><strong>Completed suicide</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>51,707</td>
<td>258,535</td>
<td>12.22 (8.67-17.22)</td>
<td>12.33 (8.73-17.42)</td>
<td>5.91 (2.45-14.27)</td>
</tr>
<tr>
<td>Male</td>
<td>36,102</td>
<td>180,510</td>
<td>10.32 (7.04-15.12)</td>
<td>10.37 (7.05-15.25)</td>
<td>3.70 (1.38-9.95)</td>
</tr>
<tr>
<td>Female</td>
<td>15,605</td>
<td>78,025</td>
<td>22.76 (10.06-51.50)</td>
<td>23.23 (10.22-52.78)</td>
<td>NA</td>
</tr>
</tbody>
</table>

Ljung et al, Jmappsychiatry, 2014:71(8):958-964
## Consequences: Suicide in Relatives of ADHD Patients

<table>
<thead>
<tr>
<th>Table 3. Attempted and Completed Suicide ORs Among Relatives of Probands With ADHD Compared With Matched Control Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relatives</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td><strong>Attempted suicide</strong></td>
</tr>
<tr>
<td>First-degree relatives</td>
</tr>
<tr>
<td>Parents</td>
</tr>
<tr>
<td>Full siblings</td>
</tr>
<tr>
<td>Second-degree relatives</td>
</tr>
<tr>
<td>Maternal half siblings</td>
</tr>
<tr>
<td>Paternal half siblings</td>
</tr>
<tr>
<td>Third-degree relatives</td>
</tr>
<tr>
<td>Cousins</td>
</tr>
<tr>
<td><strong>Completed suicide</strong></td>
</tr>
<tr>
<td>First-degree relatives</td>
</tr>
<tr>
<td>Parents</td>
</tr>
<tr>
<td>Full siblings</td>
</tr>
<tr>
<td>Second-degree relatives</td>
</tr>
<tr>
<td>Maternal half siblings</td>
</tr>
<tr>
<td>Paternal half siblings</td>
</tr>
<tr>
<td>Third-degree relatives</td>
</tr>
<tr>
<td>Cousins</td>
</tr>
</tbody>
</table>

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; OR, odds ratio.

*Excluding relatives with ADHD*
### Consequences: ADHD and Increased Mortality

<table>
<thead>
<tr>
<th>Age at first ADHD-diagnosis (years)</th>
<th>Number of deaths</th>
<th>Person-years</th>
<th>Mortality rate per 10,000 person-years</th>
<th>Crude model MRR (95% CI)*</th>
<th>Partly adjusted model MRR (95% CI)†</th>
<th>Fully adjusted model MRR (95% CI)‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>10</td>
<td>29,944</td>
<td>3.34</td>
<td>2.23 (1.11-3.91)</td>
<td>1.97 (0.99-3.46)</td>
<td>1.86 (0.93-3.27)</td>
</tr>
<tr>
<td>6-17</td>
<td>59</td>
<td>136,048</td>
<td>4.34</td>
<td>1.83 (1.40-2.35)</td>
<td>1.63 (1.25-2.09)</td>
<td>1.58 (1.21-2.03)</td>
</tr>
<tr>
<td>&gt;17</td>
<td>38</td>
<td>17,057</td>
<td>22.28</td>
<td>5.24 (3.73-7.12)</td>
<td>4.46 (3.18-6.07)</td>
<td>4.25 (3.03-5.78)</td>
</tr>
<tr>
<td>No ADHD</td>
<td>5,473</td>
<td>24,724,510</td>
<td>2.21</td>
<td>1.00 (reference)</td>
<td>1.00 (reference)</td>
<td>1.00 (reference)</td>
</tr>
</tbody>
</table>

Cohort consisted of 1.92 million children born in 1981-2011. MRR = mortality rate ratio. ADHD = attention deficit hyperactivity disorder. -- = not applicable. * Crude model adjusted for age, calendar year, and sex. †Partly adjusted model adjusted for age, calendar year, sex, parental history of psychiatric disorders, and maternal and paternal age at time of delivery. ‡Fully adjusted model adjusted for age, calendar year, sex, parental history of psychiatric disorders, maternal and paternal age at time of delivery, parental educational, and parental employment status. *p-value measures the overall effect of being diagnosed with ADHD at different ages, compared with individuals without ADHD.

Dalsgaard et al, Lancet 2015
Consequences: ADHD and Motor Vehicle Accidents (MVA)

Fig. 1. Funnel plot of relative risks and statistical weights of ADHD-studies corrected for publication bias (blue dots = real studies, red dots = added “studies”).

Truls Vaa, Accident Analysis and Prevention 62 (2014) 415-425
Consequences: Functioning, Substance use, Delinquency and Crime

- 40% less chance of graduating from High school
- Less likely to attain a Bachelor’s degree
- 2.6 times more likely to meet criteria of *Marijuana use disorder*
- Younger age at first intercourse
- More sexual partners
- Increased risk of pregnancy
- More offspring at age 18
- More than 1/4th of adult inmates have ADHD
- Estimated prevalence of adult ADHD among long term inmates was 40%

Correlations: Common Psychiatric Comorbidities

- Moderate to Severe Depression: 63%
- Dysthymia: 23%
- Bipolar Affective disorder: 20%
- Anxiety disorders: 33%
- Antisocial Personality disorder: 24%
- Borderline personality disorder: 13%
- Substance use disorder: 25%
- Learning difficulties: 33%
- Autism spectrum disorders: frequent
ADHD Treatment

Pharmacological Treatment

❖ Stimulant medication
  • Methylphenidate (Ritalin/Concerta)
  • Amphetamines (Vyvanse/Adderall)

❖ Non stimulant medication
  • Atomoxetine (Strattera)
  • Modafinil
  • Bupropion
  • Clonidine
  • Guanficine
  • Tricyclics
  • Venlafaxine

Non-Pharmacological Treatment

• Cognitive Behavioral Therapy
• School Intervention
• Social Skills Training
• Neuro-feedback
• Cognitive Training
• Nutritional Supplement
• Special Diets
ADHD: Evidence favors medication

- Stimulant Medication
- Non-Stimulant Medication
- Restricted Elimination Diets
- Artificial Food Color Exclusions
- Neurofeedback
- Computer Cognitive Training
- Omega-3 Fatty Acids
- Behavioral Parent Training

ADHD treatment effect sizes.

Prescribing rates tend to decrease with advancing age

Fig. 2  Proportion of patients aged 15 years in 1999 remaining in treatment for each 1-year change in age (n=44) (expected persistence 83%).

# ADHD Medication and Substance Related Problems

Concurrent Associations between ADHD Medication and Substance-Related Events

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Patients (n)</th>
<th>Substance-Related Events (n)</th>
<th>Population</th>
<th>Within-Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unadjusted</td>
<td>Adjusted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unadjusted</td>
<td>Adjusted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All ADHD patients</td>
<td>1,579,704</td>
<td>46,676</td>
<td>0.68</td>
<td>(0.67–0.70)</td>
</tr>
<tr>
<td>With any prior SUD</td>
<td>53,765</td>
<td>10,671</td>
<td>0.70</td>
<td>(0.67–0.75)</td>
</tr>
<tr>
<td>With no prior SUD</td>
<td>1,525,939</td>
<td>36,005</td>
<td>0.74</td>
<td>(0.72–0.76)</td>
</tr>
<tr>
<td>With no other psychiatric medications</td>
<td>836,305</td>
<td>8,506</td>
<td>0.72</td>
<td>(0.69–0.76)</td>
</tr>
<tr>
<td>With no psychotherapy</td>
<td>1,129,582</td>
<td>17,360</td>
<td>0.78</td>
<td>(0.75–0.80)</td>
</tr>
<tr>
<td>Incident diagnosis cohort</td>
<td>304,467</td>
<td>9,647</td>
<td>0.72</td>
<td>(0.68–0.76)</td>
</tr>
<tr>
<td>First events only</td>
<td>304,467</td>
<td>7,128</td>
<td>0.85</td>
<td>(0.81–0.89)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All ADHD patients</td>
<td>1,414,183</td>
<td>31,842</td>
<td>0.81</td>
<td>(0.79–0.84)</td>
</tr>
<tr>
<td>With any prior SUD</td>
<td>37,985</td>
<td>6,712</td>
<td>0.69</td>
<td>(0.64–0.74)</td>
</tr>
<tr>
<td>With no prior SUD</td>
<td>1,376,198</td>
<td>25,130</td>
<td>0.89</td>
<td>(0.86–0.91)</td>
</tr>
<tr>
<td>With no other psychiatric medications</td>
<td>481,157</td>
<td>3,237</td>
<td>0.94</td>
<td>(0.87–1.01)</td>
</tr>
<tr>
<td>With no psychotherapy</td>
<td>963,074</td>
<td>10,694</td>
<td>0.97</td>
<td>(0.93–1.02)</td>
</tr>
<tr>
<td>Incident diagnosis cohort</td>
<td>251,990</td>
<td>5,685</td>
<td>0.87</td>
<td>(0.82–0.93)</td>
</tr>
<tr>
<td>First events only</td>
<td>251,990</td>
<td>4,406</td>
<td>1.01</td>
<td>(0.95–1.07)</td>
</tr>
</tbody>
</table>

Quinn et al, Am J Psychiatry, 2017; 174 (9); 877-885
Summary

☑ It is wrong to assume that ADHD is an illness of modern times
☑ It has serious consequences for the individual and society
☑ Responsible diagnosis on established criteria needs to be made
☑ Effective and safe treatment exists that can be used to lessen distress and enhance functioning
Thank you for your attention!