Attention-Deficit/Hyperactivity Disorder: Clinical Presentation and Treatment

Naomi Ornstein Davis, Ph.D.
Assistant Professor
Duke ADHD Program
Department of Psychiatry & Behavioral Science
Duke University Medical Center

UNC School of Social Work
Focus on Family and Disability Seminar
Presentation Goals

- What is ADHD?
- Evidence-based treatments for ADHD
- Diagnostic process for ADHD
- Prevalence and clinical presentation of ADHD
A brain-based disorder that causes *inattention*, *hyperactivity*, and/or *impulsivity* at a level that exceeds developmental expectations.
The Earliest Reference to ADHD in the Medical Literature? Melchior Adam Weikard’s Description in 1775 of “Attention Deficit” (Mangel der Aufmerksamkeit, Attentio Volubilis)

Russell A. Barkley¹ and Helmut Peters²

Abstract

Objective: The present article reports on the discovery and translation of a chapter in a 1775 medical textbook by the German physician, Melchior Adam Weikard, which describes attention disorders. This article is believed to be the earliest reference to the syndrome that today is known as attention deficit hyperactivity disorder, or ADHD. Method: The authors briefly discuss previous efforts to identify the earliest description of ADHD thought to be the lectures of George Still in 1902 and subsequently, the medical textbook by the physician, Alexander Crichton, in 1798. Background is provided on Weikard followed by the English translation of his short chapter on attention deficits and the rationale for why it should be viewed as relevant to the history of ADHD. Results and Conclusions: The authors argue that Weikard’s description in 1775 now deserves to be credited with providing the first description of attention disorders in the medical literature known to date. (J. of Att. Dis. 2011; XX(X) I-XX)
ADHD Historical Timeline

1930

Minimal Brain Damage

1960

Hyperkinetic Reaction of Childhood (DSM-II)

1968

Minimal Brain Dysfunction

1980

Attention Deficit Disorder + or - Hyperactivity (DSM-III)

1987

Attention Deficit Hyperactivity Disorder (DSM-III-R)

1994

Attention-Deficit/ Hyperactivity Disorder (DSM-IV)

2013

Attention-Deficit/Hyperactivity Disorder (DSM-IV-TR)

DSM-5

DSM-5
# DSM-5 Criteria for ADHD

1. Significant and age-inappropriate symptoms of inattention and/or hyperactivity/impulsivity (≥6; 5 for older adolescents and adults)
2. Onset of symptoms prior to age 12
3. Several symptoms present in two or more settings
4. Clear evidence of impairment in social, academic, or occupational functioning
5. Symptoms are not better accounted for by another mental disorder

<table>
<thead>
<tr>
<th>Subtypes based on symptom profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Predominantly Inattentive Presentation</td>
</tr>
<tr>
<td>• Predominantly Hyperactive/Impulsive Presentation</td>
</tr>
<tr>
<td>• Combined Presentation</td>
</tr>
<tr>
<td>Inattention</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Fails to give close attention to details/makes careless mistakes in schoolwork or other activities</td>
</tr>
<tr>
<td>Trouble holding attention on tasks or play activities</td>
</tr>
<tr>
<td>Does not seem to listen when spoken to directly</td>
</tr>
<tr>
<td>Does not follow through on instructions and fails to finish schoolwork, chores</td>
</tr>
<tr>
<td>Trouble organizing tasks and activities</td>
</tr>
<tr>
<td>Avoids, dislikes, or is reluctant to do tasks that require sustained mental effort (such as schoolwork or homework)</td>
</tr>
<tr>
<td>Loses things necessary for tasks and activities (e.g. school materials, pencils, books)</td>
</tr>
<tr>
<td>Easily distracted</td>
</tr>
<tr>
<td>Forgetful in daily activities</td>
</tr>
</tbody>
</table>
Etiology ADHD

- Brain structure and chemicals
- Genetics
- Brain injury or infection
- Environmental Factors

Biederman & Faraone, 2005
Subcortical brain volume differences in participants with attention deficit hyperactivity disorder in children and adults: a cross-sectional mega-analysis


Summary

Background Neuroimaging studies have shown structural alterations in several brain regions in children and adults with attention deficit hyperactivity disorder (ADHD). Through the formation of the international ENIGMA ADHD Working Group, we aimed to address weaknesses of previous imaging studies and meta-analyses, namely inadequate sample size and methodological heterogeneity. We aimed to investigate whether there are structural differences in children and adults with ADHD compared with those without this diagnosis.

Hoogman et al., Lancet Psychiatry, 2017
Genetic Basis for ADHD

• One of the most highly heritable of all psychiatric disorders based on family, twin, and adoption studies

• Parents with ADHD have more than 50% chance of having a child with ADHD

• About 25% of children with ADHD have a parent who meets criteria for ADHD

Coretese, Eur J Paediatr Neurol. , 2012; Takeda et al., J Pediatrics, 2010
## Commonly Studied Environmental Risk Factors

<table>
<thead>
<tr>
<th>Pre- and perinatal maternal factors</th>
<th>Environmental toxins</th>
<th>Dietary factors</th>
<th>Psycho-social adversity</th>
</tr>
</thead>
</table>

**BUT**

- Studies have shown *correlations* rather than *causality*
- Environmental factors may interact with genetic factors
- These factors collectively explain a small proportion of the variance in the disorder

*Thapar et al. 2013*
Presentation Goals

- What is ADHD?
- Prevalence and clinical presentation of ADHD
- Diagnostic process for ADHD
- Evidence-based treatments for ADHD
Clinical Presentation Across the Lifespan

- Easily distracted
- Homework problems
- Disruptive in class
- Seem unwilling or unable to complete tasks
- Inner restlessness
- Disorganized schoolwork
- Does not work independently
- “Risky” behaviors
- Poor peer relationships
- Disorganized
- Difficulty starting/finishing projects
- Misjudges time
- May have job/relationship difficulties

- Low compliance
- Always on the go
- Vigorous play
- Argumentative
- Excessive tantrums
- Risky behaviors
- Poor peer relationships
- Always on the go
- Vigorous play
- Argumentative
- Excessive tantrums
ADHD: A Lifelong Disorder

Up to 65% exhibit symptoms into adulthood

30%–80% exhibit symptoms into adolescence

ADHD in Children

ADHD in Adolescents

ADHD in Adults

1Dulcan et al. 1997
2Kessler et al., 2006
Prevalence in Children/Adolescents

Clinical estimates using DSM criteria suggest 5-8% (see meta-analysis by Wilcutt, 2012) BUT variability in prevalence ratings based on methods used

Figure 1. Children aged 4–17 years with diagnosed ADHD, by age and sex: United States, 2011–2013
ADHD Prevalence in Adulthood

4.4%
Prevalence in U.S. adults (survey data; Kessler et al. 2006)

2-8%
Percent of college students who self-report clinically significant symptoms of ADHD (DuPaul et al., 2009)

25%
College students with disabilities who are receiving services for ADHD (DuPaul et al., 2009)
Impact of ADHD on Academics

- 80% have academic performance problems
- 25-50% receive special education (many more have other accommodations)
- 10-38% fail to graduate

Barkley, 2006; Bussing et al., 2007; Lopez et al., 1996
Impact of ADHD on School Behavior

• Hyperactive and impulsive behaviors disrupt classroom and peers
• “Immature” or “silly” behaviors are present, especially during less structured times
• Inattentive symptoms require more redirection from teacher
• More frequent office referrals are made
## Lifetime Impact on the Individual

<table>
<thead>
<tr>
<th>Lower academic achievement</th>
<th>Lower occupational/vocational success</th>
<th>Higher divorce rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased risk of driving accidents/tickets</td>
<td>Increased risk for psychiatric problems/suicide attempt</td>
<td>Increased risk of accidents and ER visits</td>
</tr>
<tr>
<td>Higher rates of substance use/addiction</td>
<td>More likely to be arrested/incarcerated</td>
<td>What factors are associated with better outcomes?</td>
</tr>
</tbody>
</table>

Impact on Society

Doshi et al., JAACAP, 2012
Presentation Goals

- What is ADHD?
- Diagnostic process for ADHD
- Evidence-based treatments for ADHD
- Prevalence and clinical presentation of ADHD
Key Questions in Identifying ADHD

• Are the core symptoms clearly present?
• Does objective evidence show that symptoms cause significant impairment in school, work, or social domains and in daily adaptive functioning?
• Have symptoms been observed as part of the person’s behavior across situations throughout childhood?
• What evidence is there that symptoms are not due to lack of effort, inappropriate expectations, or transient situational circumstances?
• Are symptoms better explained by another psychiatric or medical diagnosis?
• Might other psychiatric diagnoses coexist with ADHD symptoms?

Murphy & Adler, 2004
Clinical interviews with the individual/family

Standardized rating scales from multiple informants

Components of Best Practice Assessment

Evaluation of co-morbid disorders

If indicated: psychoeducational testing, observation, school record review

Conners & Jett, 2006; Baumgaertel & Wolraich, 1998; Greenhill, 1998; Practice Parameter, 2007
Components of Clinical Interview

Medical and Family history
Developmental history
Psychiatric history
Functioning across domains

Conners & Jett, 2006; Baumgaertel & Wolraich, 1998; Greenhill, 1998
ADHD Rating Scales

• Easy to administer
• Multiple sources: Parent, teacher, self-report
• Quantifies how behavior deviates from norms
• Not to be used alone to make/refute diagnosis
• Helpful in assessing and monitoring response to treatment

NICHQ Vanderbilt Assessment Scales

The NICHQ Vanderbilt Assessment Scales are used by healthcare professionals to help diagnose ADHD in children between the ages of 6 and 12. They are just one of the resources available in both the 1st Edition (2002) and 2nd Edition (2011) of the Caring for Children with ADHD toolkit.
Other “Tests” for ADHD

• Current evidence indicates that diagnosis cannot be reliably established by these tests alone:
  – Brain imaging
  – Genetic tests
  – Neuropsychological tests
  – Computerized performance tests
  – Response to stimulant medications
Assessment of Comorbid Disorders

Comorbidity is the rule, not the exception
• ~50% disruptive behavior disorder
• ~25% anxiety disorders
• ~20-30% learning disorders

## Comorbidity Matters

<table>
<thead>
<tr>
<th></th>
<th>ADHD</th>
<th>Anxiety</th>
<th>LD</th>
<th>ODD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Concentration</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Anxiety</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sadness</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Opposition</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Fidgetiness</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Appetite</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sleep</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
# Important Diagnostic Considerations

<table>
<thead>
<tr>
<th>Under-diagnosis</th>
<th>Over-diagnosis</th>
<th>Misdiagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occurs when impairing symptoms are not identified</td>
<td>• Occurs when symptoms are not at clinically significant level</td>
<td>• Occurs when symptoms are caused by another condition</td>
</tr>
<tr>
<td>• Environment may mitigate impact of symptoms</td>
<td>• Performance enhancement</td>
<td>• Could include psychiatric or medical conditions</td>
</tr>
<tr>
<td>• Other factors compensate for impairment (e.g., IQ)</td>
<td>• Patient self-diagnosis through media influence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Malingering</td>
<td></td>
</tr>
</tbody>
</table>
Presentation Goals

- What is ADHD?
- Prevalence and clinical presentation of ADHD
- Diagnostic process for ADHD
- Evidence-based treatments for ADHD
Evidence-based Treatments for ADHD

• Medication Management
• Behavioral Interventions
  – Parent Management Training
  – Contingency management at school
  – Summer Treatment Programs
  – Cognitive-Behavioral Therapy (CBT) for Adults
• Academic interventions*
• Social Skills Training with generalization*

*emerging evidence

The Multimodal Treatment of Attention Deficit Hyperactivity Disorder Study (MTA): Questions and Answers

Revised November 2009

Attention deficit hyperactivity disorder (ADHD) is the most common psychiatric disorder in childhood. Several interventions are effective in treating children with ADHD, including medications and behavior therapy. To examine how intensive treatment with medications compares with intensive behavior therapy, or with the combination of the two, NIMH sponsored the Multimodal Treatment of ADHD (MTA) study. The main findings from this study include:

- The Multimodal Treatment of ADHD (MTA) study compared the effectiveness of medication, behavior therapy, and a combination of both in treating ADHD.
- The study found that the combination of medication and behavior therapy was more effective than either treatment alone.
- The study also found that the combination of medication and behavior therapy was more effective in reducing symptoms of ADHD in children than either treatment alone.

For more information on the Multimodal Treatment of ADHD (MTA) study, please visit the NIMH website.
Medication Management

- Stimulants
- Non-stimulants
- Antihypertensives

Resource for families: http://chadd.org/Understanding-ADHD/For-Parents-Caregivers/Treatment-Overview/Medication-Chart.aspx
## Stimulant Impact on Symptoms

### Likely improvement

- ADHD core symptoms
- Noncompliance
- Aggression
- Social interaction
- Academic productivity

### Unlikely improvement

- Intelligence
- Organizational/Study Skills
- Athletic Skills

**Methylphenidate-based** (e.g., Ritalin, Concerta)  
**Amphetamine-based** (e.g., Adderall, Vyvanse)
Issues in Use of Medications

- Efficacy
- Side Effects
- Dosage
- Comorbidity
- Maintenance
Why Psychosocial Interventions?

<table>
<thead>
<tr>
<th>Limitations of medication</th>
<th>Benefits of combo treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 5-25% non-responders</td>
<td>• Gains may be superior to medication alone</td>
</tr>
<tr>
<td>• Continued residual symptoms</td>
<td>• May lower acute and lifetime dosages of</td>
</tr>
<tr>
<td>• Lack of generalizability</td>
<td>medication</td>
</tr>
<tr>
<td>• Do not address co-occurring problems</td>
<td>• Increased parental satisfaction</td>
</tr>
</tbody>
</table>
Parent Behavior Management Training

PT programs are all based on a social learning model and target dysfunctional parenting practices (e.g., negative, inconsistent, punitive parenting) to elicit change.

- [www.incredibleyears.com](http://www.incredibleyears.com) (Webster-Stratton)
- [www.triplep.net](http://www.triplep.net) (Positive Parenting Program)
ABCs of Effective Behavior Management

- Increase clarity and specificity of expectations and instructions
- Increase frequency, consistency, and immediacy of consequences
- Increase salience and variability of reinforcement
Behavioral Parent Training

- **Core Components**
  - Psychoeducation
  - Effective Instructions
  - Establishing Rules
  - Praise, Attending, and Rewards
  - Ignoring/Differential Attention
  - Token Economy Systems
  - Nonphysical/Effective Punishments (e.g., time-out)

- **Recommended Components**
  - Stress management for parents
  - Home-school report cards
  - Parental cognitive restructuring
Contingency Management

• Token economy system
• Response cost
• Time-out from positive reinforcement
Impact on Parent-Child Relationships

**Neurocognitive Deficits:**
- Attention
- Self-control
- Working memory

**Behavioral Difficulties**
- Off-task
- Noncompliant
- Disruptive
- Trouble using compensatory skills

**Impairments**
- Academically
- Socially
- Home/self-care

**Parenting Problems**
- Negative expectations
- Coercive cycle
- Withdraw

**Externalizing**
- Attention-seeking
- Defiance
- Anger

**Internalizing**
- Withdrawn
- Less effort
- Low self-efficacy

**Parent Stress**
- Frequent correction
- Fewer pleasant interactions

**Parenting Skills**
- Positive attention
- Clear expectations
- Calm, consistent consequences

**Child Efficacy**
- More positive times
- Secure relationship
- Success experiences
Positive Changes in Relationships

Neurocognitive Deficits:
- Attention
- Self-control
- Working memory

Behavioral Difficulties
- Off-task
- Noncompliant
- Disruptive
- Trouble using compensatory skills

Impairments
- Academically
- Socially
- Home/self-care

Effective Parenting
- Realistic expectations
- Less stress
- More positive times

Parenting Skills
- Positive attention
- Clear expectations
- Calm, consistent consequences

Child Efficacy
- More positive times
- Secure relationship
- Success experiences
Research on Parent Training

Multiple reviews and meta-analyses support some (but not all) outcomes:

- Increased compliance
- Reduction in ADHD symptoms
- Improvements in parenting

Limitations

- Short-term versus long-term benefits
- Generalization
- Logistics
- Parental and child factors

Coates et al., 2015
Behavior therapy first → fewer classroom problems compared to medication first

Best outcome: behavior therapy first with added medication if insufficient response

Poorest outcome: medication management first with added behavior therapy if insufficient response
Organizational Skills Training

• Externalizing problems as “glitches”

• Behavioral skills:
  – Materials organization
  – Tracking assignments
  – Planning & problem solving
  – Time management

• “Over-learn” skills to promote consistency

• Contingencies in session

Abikoff et al., 2012
<table>
<thead>
<tr>
<th>Steps for Success with Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>❖ Child writes down the assignment</td>
</tr>
<tr>
<td>❖ Child understands the assignment before coming home</td>
</tr>
<tr>
<td>❖ Child checks materials s/he will need to bring home</td>
</tr>
<tr>
<td>❖ Child arrives home with needed materials</td>
</tr>
<tr>
<td>❖ Child starts to do homework</td>
</tr>
<tr>
<td>❖ Child completes homework (neatly and accurately)</td>
</tr>
<tr>
<td>❖ Child puts completed homework in notebook/backpack</td>
</tr>
<tr>
<td>❖ Child takes homework back to school</td>
</tr>
<tr>
<td>❖ Child keeps track of homework until the proper class</td>
</tr>
<tr>
<td>❖ Child turns in homework</td>
</tr>
</tbody>
</table>
Homework Plan and Rules

• Homework time is mandatory
• Time is protected
• When: start time including number of parental reminders
• Where: location with minimal distractions that allows for monitoring
• How long: plan for managing breaks
• What: both daily work and studying/project time

Rewards reinforce new homework behaviors
Teaching Organizational Skills

Goal
What do you want?

List Steps
What do you have to do?
What do you need?

Arrange Steps
Best order for steps?
How much time needed for each step?
How do steps fit into schedule?
How much do I need to complete each day?

Did it work?
Did you meet your goal?
Neat and complete?
Would you do anything differently next time?
Comorbidity: Implications for ADHD Treatment

- Depression and associated symptoms (e.g., fatigue, hopelessness) may interfere with consistent use of organizational skills
- Anxiety about ability to be successful may result in avoidance of school
- Add evidence-based treatments for depression to ADHD treatments (e.g., Cognitive-Behavioral Therapy; CBT)
- Combined treatments likely needed
- Decreasing ADHD-related difficulties may decrease anxiety and/or depression
Think about a student with ADHD. What aspects of school are challenging for a student with ADHD? What types of unmet needs does this student have in the school setting?
ADHD and School-Based Interventions

Students benefit from school staff that is knowledgeable about ADHD, flexible in teaching style, and views the problem behaviors as separate from the child.

• Psychoeducation for teachers
• Behavioral interventions in the classroom (e.g., Daily Report Card)
• Accommodations/classroom modifications (informal or via IEP/504 Plan)

## Daily Report Card

<table>
<thead>
<tr>
<th>Establish Clear Goals</th>
<th>Provide Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track behaviors to determine need, frequency, goals</td>
<td>Give frequent feedback through the day</td>
</tr>
<tr>
<td>Describe what TO DO rather than what not to do</td>
<td>Make feedback very specific to goal</td>
</tr>
<tr>
<td>Set only 3-4 goals at a time</td>
<td>Motivate behavior with meaningful incentives</td>
</tr>
<tr>
<td>Make goals achievable!</td>
<td>Be consistent over time, across teachers</td>
</tr>
</tbody>
</table>
# Sample Daily Report Card

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th>Period 2</th>
<th>Period 3</th>
<th>Period 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael kept hands and feet to himself</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Michael stayed on task with 2 or less reminders</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Michael put supplies in proper places when finished</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

Total # of YESes ____  Percentage of YESes ____
Attention-deficit hyperactivity disorder, multimodal treatment, and longitudinal outcome: evidence, paradox, and challenge

Stephen P. Hinshaw,¹* L. Eugene Arnold² and For the MTA Cooperative Group

Given major increases in the diagnosis of attention-deficit hyperactivity disorder (ADHD) and in rates of medication for this condition, we carefully examine evidence for effects of single versus multimodal (i.e., combined medication and psychosocial/behavioral) interventions for ADHD. Our primary data source is the Multimodal Treatment Study of Children with ADHD (MTA), a 14-month, randomized clinical trial in which intensive behavioral, medication, and multimodal treatment arms were contrasted with one another and with community intervention (treatment-as-usual), regarding outcome domains of ADHD symptoms, comorbidities, and core functional impairments. Although initial reports emphasized the superiority of well-monitored medication for symptomatic improvement, reanalyses and reappraisals have highlighted (1) the superiority of combination treatment for composite outcomes and for domains of functional impairment (e.g., academic achievement, social skills, parenting practices); (2) the importance of considering moderator and mediator processes underlying differential patterns of outcome, including comorbid subgroups and improvements in family discipline style during the intervention period; (3) the emergence of side effects (e.g., mild growth suppression) in youth treated with long-term medication; and (4) the diminution of medication’s initial superiority once the randomly assigned treatment phases turned into naturalistic follow-up. The key paradox is that while ADHD clearly responds to medication and behavioral treatment in the short term, evidence for long-term effectiveness remains elusive. We close with discussion of future directions and a call for greater understanding of relevant developmental processes in the attempt to promote optimal, generalized, and lasting treatments for this important and impairing neurodevelopmental disorder. © 2014 John Wiley & Sons, Ltd.

How to cite this article:
Interventions for College Students

• Limited research to date (several open trials, 1 coaching manual) (He & Antshel, 2017; Swartz, Prevatt, & Proctor, 2005)

• “The most prudent conclusion is that cognitive-behavioral treatments, perhaps combined with medication, should be used to treat ADHD in this age group” (p. 245, DuPaul et al., 2009)

• What is the optimal cognitive behavioral treatment for this age group?
Description and Demonstration of CBT for ADHD in Adults

Susan E. Sprich
Laura E. Knouse
Christine Cooper-Vince
Jennifer Burbridge
Steven A. Safren

Massachusetts General Hospital and Harvard Medical School
Online ADHD Resources

http://www.chadd.org
• National organization that provides education, advocacy, and support for ADHD.

http://www.help4adhd.org/
• National Resource Center on ADHD provides resources for individuals with ADHD

• NIMH site provides education about ADHD across the lifespan.

http://www.psychiatry.org/adhd
• American Psychiatric Association site with general information on ADHD

• American Academy of Child and Adolescent Psychiatry website
Thank you

naomi.davis@duke.edu