Attention Deficit Hyperactivity Disorder: Mental Illness or Learning disability?

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Attention Deficit Hyperactivity Disorder: Mental Illness or Learning Disability?

The goal of this presentation is to provide information regarding ADHD, a developmental condition, that affects learning, social, occupational and emotional functioning of the individual.

Upon completion of this presentation, participants will have increased knowledge regarding:

- DSM-5 diagnostic criteria for ADHD
- Pathophysiology of ADHD
- Significant psychiatric comorbidities of ADHD and how it affects treatment and prognosis
- Treatment and Management of ADHD
A mental disorder is characterized by:

- Clinically significant disturbance in an individual's cognition, emotional regulation or behavior
- Reflecting a dysfunction in the psychological, biological or developmental processes underlying mental functioning
- Associated with significant distress in social, occupational or other important activities
- Must not be merely an expectable response to common stressors and losses (for example, loss of a loved one) or a culturally sanctioned response to a particular event (for example, trance states in religious rituals)
- That it is not primarily a result of a social deviance or conflicts with society.
Learning disabilities refer to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or non-verbal information. These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and/or reasoning. Learning disabilities range in severity and may interfere with the acquisition and use of one or more of the following:

- Oral language (e.g. Listening, speaking, understanding)
- Reading (e.g. Decoding, phonetic knowledge, word recognition, comprehension)
- Written language (e.g. Spelling, written expression)
- Mathematics (i.e. computation, problem solving)
Inattentive: must include at least 6 of the following symptoms of inattention that must have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level.

- Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
- Often has difficulty sustaining attention in tasks or play activities
- Often does not seem to listen to what is being said
- Often does not follow through on instructions and fails to finish schoolwork, chores or duties in the workplace (not due to oppositional behaviors or failure to understand instructions)
- Often has difficulties organizing tasks and activities
- Often avoids or strongly dislikes tasks (such as schoolwork or homework) that requires sustained mental effort
- Often loses things necessary for tasks or activities (school assignments, pencils, books, tools or toys)
- Often is easily distracted by extraneous stimuli
- Often forgetful in daily activities
Hyperactivity/ Impulsivity: must include at least 6 of the following symptoms of hyperactivity- impulsivity for at least 6 months to a degree that is maladaptive and inconsistent with developmental level.

- Fidgeting with or tapping hands or feet, squirming in seat
- Leaving seat in classroom or in other situations in which remaining seated is expected
- Running about or climbing excessively in situations where this behavior is inappropriate (in adolescents or adults, this maybe limited to subjective feeling of restlessness)
- Difficulty playing or engaging in leisure activities quietly
- Unable to be or uncomfortable being still for extended periods of time (may be experienced by others as "on the go" or difficult to keep up with)
- Excessive talking
- Blurtting out answers to questions before the question has been completed
- Difficulty waiting in lines or awaiting turn in games or group situations
- Interrupting or intruding on others (for adolescents and adults, may intrude into or takeover what others are doing)
Other

- Onset is no later than age 12
- Symptoms must be present in 2 or more situations, such as school, work or home
- The disturbance causes clinically significant distress or impairment in social, academic or occupational functioning
- Disorder does not occur exclusively during the course of schizophrenia or other psychotic disorder and is not being accounted for by mood, anxiety, dissociative, personality disorder or substance intoxication or withdrawal
Specifications:
Based on social or occupational functional impairment:
- Mild- minor impairment
- Moderate- impairment between mild and severe
- Severe-symptoms in excess of those required to meet diagnosis, marked impairment
Major tasks of **executive function** that are most commonly distorted with ADHD/ADD:

- **Shifting from one mindset or strategy to another** - flexibility
- **Organization** - anticipating both needs and problems
- **Planning** - goal setting
- **Working memory** - receiving, storing, retrieval of information within short term memory
- **Separating affect from cognition** - detaching one’s affect from one’s reason
- **Inhibiting and regulating verbal and motoric action** - jumping to conclusions too quickly, difficulty waiting in line in an appropriate fashion
Neuropsychological studies

Studies suggest that the frontal cortex and circuits linking them to the basal ganglia are critical for executive function.

- A functional MRI study in children with ADHD who performed response-inhibition tasks, showed differing activation in frontostriatal areas compared with healthy controls.

- 2010 study in adults with ADHD, presence of frontostriatal malfunctioning in the etiology of ADHD.


- Recent studies demonstrated changes just outside the frontostriatal region—cerebellum and parietal lobes.

**Neuropsychological studies**

- Proton magnetic spectroscopy demonstrated **right prefrontal neurochemical changes in adolescents with ADHD.**
  

- Sobel et al- **deformations in the basal ganglia nuclei (caudate, putamen, globes pallidus)** in children with ADHD; the more prominent the deformations, the greater the severity of symptoms; stimulants may normalize the deformations.
  

- Spinelli et al- examined fMRI brain activation patterns of children, 8-13yo with and without ADHD on a go/no go task. Noted lapses in attention preceded response inhibition errors in children without ADHD. Brain circuitry involved in response selection and control was activated prior to errors in children with ADHD.
  
Shaw et al- neuroanatomic MRI images in 197 children with ADHD compared to 193 typically developing children with varying levels of symptoms of hyperactivity and impulsivity, measured with Conners Rating Scale. Children with higher levels of hyperactivity/ impulsivity had a slower rate of cortical thinning- most notable in prefrontal cortical regions, bilaterally in the middle frontal/ premotor gyri, extending down the medial prefrontal wall to the anterior cingulate, also noted in the orbitofrontal cortex and the right inferior frontal gurus.

Slower optical thinning in adolescence is characteristic of ADHD and provides neurobiological evidence for dimensionality.

Neuropsychological studies

- Psychostimulants, which facilitate dopamine release and noradrenergic tricyclics used to treat ADHD have led to speculation that certain brain areas related to attention are deficient in neural transmission. The catecholamines dopamine and norepinephrine are the main neurotransmitters with frontal lobe function and therefore have been associated with ADHD.
PET scan imaging indicates that methylphenidate acts to increase dopamine.


PET scan study by Volkow et al revealed that in adults with ADHD, depressed dopamine activity in caudate and preliminary evidence in limbic regions was associated with inattention and enhanced reinforcing responses to intravenous methylphenidate. This concludes that dopamine dysfunction may be involved with symptoms of inattention but may also contribute to substance abuse comorbidity.


Some investigations have begun exploring a possible role for 5-hydroxytryptamine (5-HT). Although the brain's motor regions are innervated by 5-HT projections, no connection between 5-HT and ADHD motor pathology has yet been identified. However, 5-HT activity appear to be part of the cause of the difficulties with perceptual sensitivity and the appropriate recognition of the relative significance of stimulation.

Wilkos M, Pataki C. Pediatric Attention Deficit Hyperactivity Disorder (ADHD). Drugs and Diseases> Pediatrics: Developmental and Behavioral Articles
Approximately **30-50% of people with ADHD/ADD have other significant psychiatric comorbidities which varies widely.** This is due to many factors, including the specific area of deficit, the patient's environmental response to and interaction with the deficits, the therapy provided and the presence of coexistent conditions. These comorbidities affect treatment and prognosis.
Comorbidities of ADHD

- Anxiety disorders - GAD, OCD, Panic Disorder, Social Phobia
- Bipolar disorder
- Communication disorder (receptive, expressive)
- Conduct disorder (Oppositional Defiant Disorder in children)
- Depression
- Dissociative disorders
- Eating disorder
- Enuresis/encopresis
Comorbidities of ADHD

- Learning disability - Reading, Written Expression, Mathematics
- Pervasive developmental disorder including Asperger syndrome
- Post traumatic stress disorder
- Psychotic disorder
- Sleep disorder (sleep apnea, restless leg syndrome, delayed sleep phase syndrome)
- Substance related disorders
- Thought disorder
- Tourette syndrome or other tic disorders
TREATMENT
The **age of the child at initial diagnosis and severity of ADHD/ADD symptoms** affect the extent to which the child benefits from working with educational specialists.

- Development of study skills
- Teacher's periodic feedback
- Implementation of academic accommodations and adaptations
- Behavioral classroom management
Psychotherapeutics

- Psychologists, counselors, clinical social workers
- Behavioral modification
- Behavioral parent training
- Family therapy
- Coexisting conditions must be addressed as part of therapy
- For adolescents, ADHD/ADD coaching, participating in a support group or both- help normalize the disorder and assist them in obtaining well focused peer feedback and general information

Behavioral psychotherapy often is effective when used in combination with medication.
In children and adolescents, there is evidence that non-pharmacological treatments are efficacious to address disorders and impairments associated with ADHD (e.g., oppositional behaviors and poor parenting via behavioral intervention, and working memory impairment via working memory training.

In adults, the value of non-pharmacological interventions is less clear. Recent systematic reviews have shown some positive effects on symptoms for the treatment of adult ADHD for mindfulness, dialectical behavior therapy and cognitive behavior therapy.
A comprehensive evidence informed hierarchy of ADHD drugs based on their efficacy and tolerability is not yet available.

**Psychostimulants are effective.** Psychostimulants are the most studied and found to be significantly more efficacious than placebo.

However, **compliance is an issue.** The use of long acting medications at once-a-day dosing is advantageous demonstrating better adherence, higher rates of remission and less stigmatizing.

- Methylphenidate: IR, SR, ER, OROS, transdermal patch, Dexmethylphenidate IR and ER
- Dextroamphetamine: ER, spansules, mixed amphetamine salt XR, mixed amphetamine salt IR, Lisdexamfetamine, Amphetamine
Non-psychostimulants

- Atomoxetine
- Extended release Clonidine
- Extended release Guanfacine
- **Off label use of**: Modafinil, antidepressants (bupropion, venlafaxine, desipramine, paroxetine, nomifensine, reboxetine, duloxetine)
An estimated 15-20% of children with ADHD maintain the full diagnosis into adulthood. As many as 65% of these children will have ADHD or some residual symptoms of ADHD as adults.

Hyperactive symptoms may decrease with age because of developmental trends toward self control and changes in brain composition that occur during late adolescence. Inattentive symptoms however tend to remain constant into adulthood. People with ADHD/ADD developmentally mature later than the average population.
The **prognosis is good if**:

- No major comorbidity
- Medication management also addresses comorbidities
- Patients and caregivers receive education about ADHD and its management
- Adherence to therapy continues
- Learning disabilities are diagnosed and remediation is provided
- Coexisting emotional problems are identified and treated appropriately by mental health professional
References


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THE END

QUESTIONS?