Attention-Deficit/Hyperactivity Disorder (ADHD) in Adults — Symptoms and Treatment

Attention deficit hyperactive disorder is a developmental condition of inattentiveness and easy distractibility with accompanying episodes of hyperactivity. The disease affects about 8-12 % of children in the world while the worldwide adulthood prevalence is 4-5 %. The disease arises from genetic mutations that may occur due to toxin exposure or hypoxic-ischemic brain injury in the perinatal period. These etiologies cause neurotransmitter deficiencies or structural changes in the brain areas involved in the control of attention and mood (basal ganglia and frontal cortex).

Definition

ADHD is a neurodevelopmental disorder characterized by problems of:

- Paying attention
- Excessive activity
- Inappropriate behavior for the person’s age

The disease is characterized into three variations in symptomatic presentation:
1. Deficient attention to activities where a person frequently veers off the tasks he/she engages in. The main problem is lack of focus and not defiance or incomprehension of instructions.

2. Hyperactivity/impulsiveness where the patient is restless, becomes fidgety and cannot remain still as needed.

3. A variety of patients have the combined hyperactivity and inattentiveness. These patients usually act quickly without thinking, they have trouble concentrating in school/learning institutions while the impulsiveness and talkative behavior leads to social segregation.

The magnitude of neurodevelopmental derangement is so severe that it leads to a compromised social, economic, and educational impact.

**Epidemiology of ADHD in Adults**

The disease affects about 8–12 % of children in the world while the worldwide adulthood prevalence is 4–5 %. It is a childhood disease with the hyperactive subtype being the most common in those aged 7–12 years. **15-20 % of the children will carry the disease into adulthood.**

Boys are more affected than girls with a male:female ration of 5:1 seen in the occurrence of the disease.

The combined subtype of the disease is the most common form, the inattentive subtype is more common among girls while the hyperactive subtype is more common in boys.

In the United States, the incidence was 11 % in the year 2011 where a constant rise in the prevalence of the disease has been estimated over the last decade. Literature shows that it is a disease of school going children.

**Risk factors**

The risk of developing the disease increases with:

- Presence of first degree relative who had a similar disease
- Exposure to toxins such as lead in pipes and paints
- Maternal exposure to drugs, alcohol, and cigarette smoke
- Premature birth and associated perinatal hypoxic injury

**Etiology of ADHD in Adults**

The disease arises from exposure to risk factors mentioned above leading to a slow development of the disease.

**Genetics:** Attention deficit hyperactive disorder is thought to be a familial disease where children have 2-8 times the risk of developing the disease if born of affected parents. The genetic mutations that are incriminated include genes that encode for dopamine receptors such as DRD4, DRD5, DAT, DRH, 5-HTT, and 5 HTR 1B.

Intrauterine toxin exposure to mutation inducing toxins such as chemicals in food additives and cigarette smoke taken by the mother predisposes the fetus to toxin exposure thus leading to DNA damage and possible mutations that cause
alteration in neurobehavioral development.

Perinatal hypoxic/ischemic brain injuries that damage the neurohormonal mechanisms of the brain can be a cause.

**Personality factors naturally predispose some children to suffering of the disease.**

Toxin exposure at young age such as lead in water and soils lead to neurohumoral brain damage.

**Pathophysiology and Embryological Rotation of the Gut**

Several theories have been put forward to explain the cause of Attention Deficit Hyperactive Disorder with the *majority of them having little or no scientific evidence to prove the association.*

**Neurotransmitter deficiency:** The theory states that deficiency of neurotransmitters such as dopamine and norepinephrine in areas of the brain that are responsible for attention and control of activity and behavior (frontal and prefrontal cortex) is the reason for the disease. The lack of message transmission causes problems of initiating and maintaining resistance. Evidence to support this theory includes:

- Positive response is seen with administration of drugs that increase the levels of neurotransmitters in the brain
- Include stimulant drugs such as methylphenidate
- Functional MRI studies and positron emission tomography studies of these brain areas that show reduced neurotransmission thus reduced brain activity

**Structural changes in the basal ganglia nuclei** (Globus pallidus and putamen) and cerebellum which are the areas that control attention, behavior, and emotions. Thus, structural derangements cause:

- Reduced brain activity
- Difficulty in performing some tasks
- Impaired attention
- Unstable emotions

The cause of structural changes can be:

- Perinatal hypoxic-ischemic injury that destroys the converging glutaminergic neurons
- Fetal circulatory insufficiency that predisposes to loss of autoregulation of fetal blood supply and ischemic injury of secluded sites such as the striatum

**Deficiency in cognitive function:** Neurophysiological deficits seen in cognitive function are seen even at rest and impair one’s ability to regulate and maintain attention since the involved brain areas are deficient of task processing abilities.

**Classification of ADHD in Adults**

Attention deficit hyperactive disorder in classified into three major subtypes:

1. **Predominantly inattentive**
The patient is deficient in attention to activities where a person is disorganized and veers off the tasks where he/she engages in. The main problem is lack of focus and not defiance or incomprehension of instructions.

2. **Predominantly Hyperactive/impulsive**

The patient is restless and becomes fidgety with tapping and restlessness. The person cannot remain still as needed. The person bursts into impulses and talks a lot.

3. **A variety of patients have the combined hyperactivity and inattentiveness**

These patients have a variety of symptoms from both inattentiveness and impulsivity.

### Clinical Features of ADHD in Adults

Presentation of attention deficit hyperactive disorder (ADHD) is **described by the following findings:**

- Inability to remain still, concentrate and squirm
- Louder than expected tones and express extreme anger
- Loss of appetite
- Tics of new onset
- Increased anxiety and depression due to episodes of low mood

**Mental status examination (MSE) reveals:**

- Appearance is one of fidgety, impulsive, and restless person
- Mood may be elevated with periods of low self-esteem with alternating periods of irritability
- Thought process is usually normal but has a direction towards goal
- Loud due to hallucinations and delusions
- Loss of concentration and short-term memory

### Diagnostic Criteria of ADHD in Adults

The diagnostic and statistical manual of mental illnesses (DSM 5) describes the diagnosis of ADHD by **identification of at least 6 symptoms that should have lasted for at least 6 months.**

The symptoms that make up the criteria for each subtype are as follows:

**Predominantly inattentiveness:**

- Person makes careless mistakes in daily activities such as school work due to lack of attention to details
- Failure to sustain attention
- Person does not listen to the speaker
- Failure to complete tasks and follow instructions but lacks defiance, oppositional behavior, or incomprehension of the instructions
- Disorganized tasks and functions
- The person dislikes activities that demand high levels of concentration and attention such as schoolwork
- Similarly, the person is distracted easily by any form of extraneous stimuli
- Forgetful on daily activities
**Predominantly hyperactivity:**

Identification of **at least 6 of the following symptoms for at least 6 months** gives the diagnosis:

- Person gets fidgety hands and restless feet
- Squirms in the seat
- Person cannot remain seated for long and leaves unceremoniously or rises when he/she is expected to remain seated
- Upon rising, person runs about in a manner unexpected for his/her age or level of development
- Person has difficulty in engaging in activities
- Uncomfortable with remaining still especially for long periods
- Excessive periods of outbursts such as shouting out answers before the completion of the question
- Excessive talking
- Interrupting/intruding others in their activities

**Other symptoms that reinforce the diagnosis:**

- Onset before 12 years of age
- Occurrence in two or more setups such as school, home, or work
- Symptoms cause significant impairment of social, academic, and economic dysfunction
- Disorder may occur concurrently with another mental disorder which cannot account for all the symptoms

**Investigations of ADHD in Adults**

The diagnosis of attention deficit hyperactive disorder is made based on the clinical presentation and **rarely requires further investigations**. The diagnosis is made on a presentation of a 6–12-year-old child with inattentiveness and hyperactivity mostly diagnosed by the teachers at school.

A comprehensive history of the child’s behavior to establish the existence, frequency, and the impact of the symptoms in daily life. **Interviews on the same should be done on the teachers, relatives, and caregivers.**

A thorough medical examination to rule out medical illnesses should be done.

**Differential Diagnosis of ADHD in Adults**

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Comments</th>
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<tbody>
<tr>
<td><strong>Depression</strong></td>
<td>Due to associated low mood and problems in tolerating frustration</td>
</tr>
<tr>
<td><strong>Anxiety</strong></td>
<td>Condition has low mood and cannot cope with the expectation</td>
</tr>
<tr>
<td><strong>Bipolar disorder</strong></td>
<td>Further investigation to differentiate it from ADHD due to the associated period of low mood</td>
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<tr>
<td><strong>Tourette syndrome</strong></td>
<td>It can be a cause of new onset tics</td>
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<tr>
<td><strong>Oppositional defiant disorder</strong></td>
<td>Inability to follow instructions can be confused with oppositional defiant disorder</td>
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<tr>
<td><strong>Antisocial behavior</strong></td>
<td>Due to the inability to cope with friends and expression of violence and aggression against others</td>
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Treatment of ADHD in Adults

Treatment is mainly supportive management since the disease presents a lot of difficulties in the management such as there are few/no approved medications to treat the disease and the physicians have limited experience in the management of the disease. However, some positive results have been seen in local trials with:

Medical treatment:

Stimulants such as methylphenidate are the main stay therapy and considered first line drugs in the treatment of the disease. These drugs enhance the brain function and mental ability thus, they control the lack of attention and distractibility. They work by increasing the levels of dopamine and norepinephrine in the involved brain areas.

Non-stimulants such as atomoxetine and bupropion are considered second line medications. They have adverse effects of cardiototoxicity and sudden death.

Psychosocial therapy:

Behavioral patient therapy (BPT) and Behavioral classroom training (BCT) methods ensure that the patient has a conducive environment to control the lack of attention and period of outbursts. The method is very effective and should be considered as a first line method of treatment especially in children.

Metacognitive therapy:

This enhances time management and capability to control the anxiety and depression.

Dietary modification:

The change of diet entails the cessation of intake of foods with causative toxins such as food color and food preservatives. The reduction of these toxins helps to reduce the occurrence of symptoms. Dietary stimulants such as caffeine tend to increase the occurrence of symptoms and should be avoided. Vitamin and mineral supplements have been shown to reduce the rate of symptom occurrence.

Exercises and physical activity:

Engagement of ADHD patients in various activities helps them focus on activities which trains the person to concentrate and avoid distractions.

Alternative medicine:

These include yoga and meditation that enhance relaxation and the person’s ability to concentrate on activities. Herbal remedies have shown some control of symptoms.

Neurofeedback mechanisms:

The patient is trained to couple the EEG wave with certain tasks and thus encourage the presence of brain activity in all the brain areas especially the frontal and prefrontal cortex.

Complications of ADHD in Adults

The disease is associated with:

1. Increased incidence of drug and substance abuse
Tendency to have low mood and self-esteem
2. Occurrence of suicidal and homicidal tendencies
3. More frequent accidents in childhood due to hyperactivity
4. Compromised social relations and the children become social misfits
5. Compromised education life with poor performance in school

Course and Prognosis of ADHD in Adults

Morbidity and mortality in attention deficit hyperactivity disorder (ADHD) is due to higher incidences of substance abuse which leads to suicidal tendencies.

The presence of comorbid psychiatric conditions leads to difficulty in treatment and chronicity of the disease. Otherwise the disease runs a rather predictable course.

References


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