

ADHD DIAGNOSIS: METHODS, CHALLENGES AND ADVANCES

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ABSTRACT

Attention-Deficit Hyperactivity Disorder (ADHD) is a prevalent neuropsychiatric condition that manifests in childhood and can persist into adulthood, impacting various aspects of life, including academic, occupational, and social functioning. The disorder is characterized by signs of impulsivity, hyperactivity and inattention. ADHD's exact cause is multifactorial, with genetic, neuro symptoms biological, and environmental factors contributing to its development. Brain imaging studies suggest abnormalities in brain regions responsible for attention and impulse control, with neurotransmitter dysregulation, particularly involving dopamine and norepinephrine, playing a key role. ADHD presents differently at various life stages, from inadequate academic achievement in children to difficulty maintaining relationships and employment in adults. Diagnosis involves comprehensive assessments, including interviews, rating scales, and physical exams to exclude other conditions. Treatment options typically include medications (stimulants and non-stimulants) and behavioral therapy, with a combination of approaches often yielding the best outcomes. Early diagnosis and intervention are crucial for improving the quality of life for individuals with ADHD.

KEYWORDS: ADHD, neuropsychiatric disorder, inattention, impulsivity, dopamine, norepinephrine.

INTRODUCTION

ADHD (Attention-deficit hyperactivity disorder) is a common neuropsychiatric disorder that usually starts in childhood and is marked by symptoms like impulsivity, hyperactivity, and inattention. It's considered a complex disorder caused

by both genetic and neurobiological factors. Studies show that ADHD affects around 5% of children worldwide and about 2.5% of adults.^[1]

While it was once believed that ADHD went away during adolescence, research now shows that many people continue to have symptoms into adulthood. ADHD is often linked with other mental health issues, like oppositional defiant disorder (ODD), conduct disorder, learning disabilities, substance abuse, and mood and anxiety disorders. These problems can make life harder for individuals with ADHD, affecting their performance at school, work, and in relationships.^[2]

At different stages of life, ADHD brings different challenges. Children may struggle with poor school performance, behavior issues, and social difficulties. Teens might deal with aggression, dropping out of school, and experimenting with drugs. For adults, ADHD can lead to problems like car accidents, job struggles, and difficulties in maintaining relationships.

Understanding how ADHD changes over time is important for providing the right treatment. With the right support, Many individuals with ADHD are able to manage their symptoms and improve their quality of life.^[1]

1. TYPES OF ADHD

- Predominantly inattentive
- Predominantly impulsive or hyperactive
- Combination of the above^[2,4]

2. CAUSES

The exact cause of attention deficit hyperactivity disorder (ADHD) is not fully understood, although a combination of factors is thought to be responsible.

2.1. Genetics

Genetics Since ADHD tends to run in families, it is generally thought that a person's tendency to develop the disorder is greatly influenced by the DNA of their parents. Research indicates that parents and siblings of a person with ADHD are more likely to have the illness themselves. Still, it is believed that there is more than one genetic defect causing ADHD, and the inheritance pattern is probably complicated.^[3]

2.2. Brain function and structure

Although it's unclear just how significant these differences are, research has found several potential distinctions between the brains of persons with ADHD and those without the disorder. Studies using brain scans, for instance, have revealed that persons with ADHD may have smaller brain regions and larger brain regions in different regions of the brain. According to some research, neurotransmitters may not function properly in the brains of persons with ADHD or there may be an imbalance in their levels.^[4]

2.3. Groups at risk

Additionally, some people are thought to be more susceptible to ADHD, such as those who have had brain damage during pregnancy or after suffering a severe head injury later in life. Who were born underweight or preterm (before the 37th week of pregnancy). Who suffer from epilepsy.^[5]

3. SYMPTOMS

Symptoms of attention deficit hyperactivity disorder (ADHD): There are two categories into which the symptoms of attention deficit hyperactivity disorder (ADHD) can be divided:

- Inattention (difficulty focusing and concentrating)
- Hyperactivity and impulsiveness

3.1 Inattention (difficulty focusing and concentrating)

The main indicators of inattentiveness include having a short attention span, being easily distracted, making careless mistakes, such as making mistakes in schoolwork, losing things or seeming forgetful, having trouble focusing on long or tedious tasks, appearing unable to follow instructions, constantly switching between activities or tasks, and having trouble organizing tasks.

3.2 Hyperactivity and impulsiveness

- Hyperactivity and impulsivity are characterized by a lack of thought, acting without thinking, fidgeting constantly, difficulty focusing on tasks, excessive physical movement, excessive talking, inability to wait one's turn, interrupting conversations, and little to no sense of danger.
- Serious issues in a child's life, like poor academic achievement, difficulties relating to peers and adults socially, and behavioural problems, could result from these indicators.^[6]

Some common symptoms of ADHD

- Inability to be careful or pay attention to details;
- Inability to start new tasks before finishing old ones;
- Inability to focus or remember things;
- Inability to keep quiet and speak out of turn;
- Inability to handle stress;
- Extreme impatience;
- Inability to keep calm^[7]

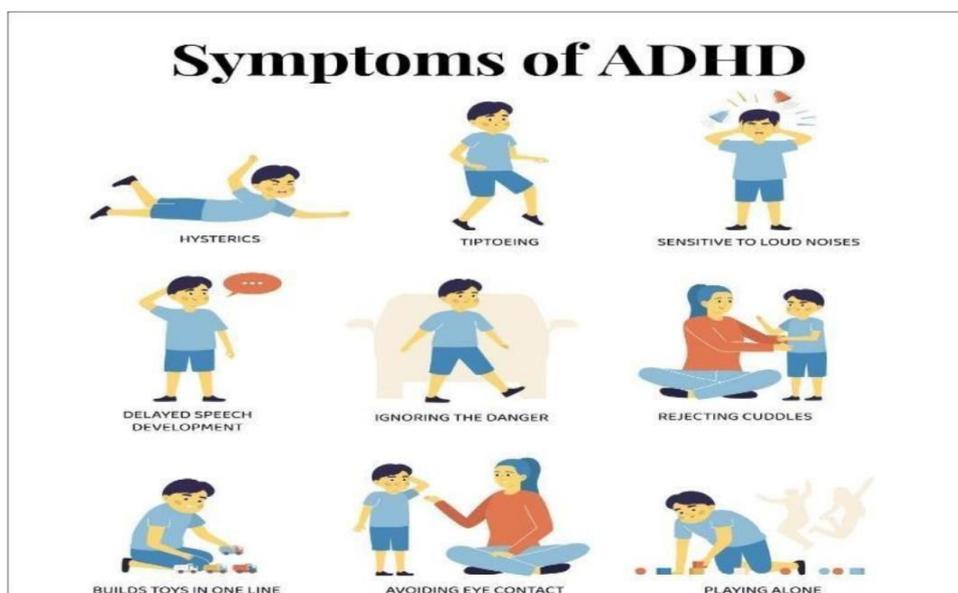
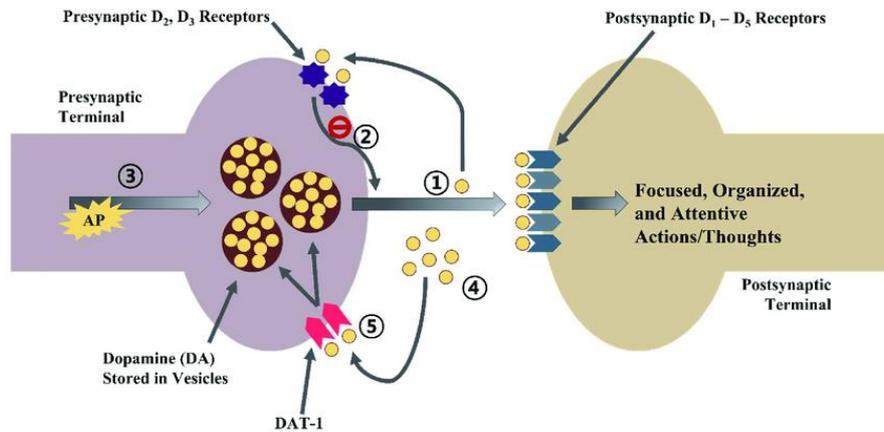


Figure No 1: Symptoms of ADHD.

4. PATHOPHYSIOLOGY OF ADHD

ADHD's pathophysiology involves neurotransmitter dysregulation, particularly reduced dopamine and norepinephrine, which affects attention and impulse control. Brain regions such as the prefrontal cortex (involved in executive functions) and the basal ganglia (linked to movement and reward processing) show structural and functional abnormalities, with delayed development in some areas. Genetics play a significant role, with certain gene variants, like **DRD4** and **DAT1**, affecting dopamine transmission. Environmental factors like prenatal exposure to toxins or early childhood adversity can also contribute. These elements collectively result in the characteristic inattention, hyperactivity, and impulsivity seen in ADHD.^[8]



Source: Research Gate

Fig 2: Mechanism of Action of ADHD.

5. ETIOLOGY

5.1 Brain Structure and Function

Key Brain Regions

- **Prefrontal Cortex (PFC):** In charge of executive processes such as focus, judgement, and impulse control. Research indicates that people with ADHD have lower activity and volume levels, which may be a factor in symptoms like impulsivity and inattention.
- **Caudate Nucleus:** Engaged in both cognitive and motor control functions. Planning and organization might suffer from deficiencies in this domain.
- **Cerebellum:** Contributes to cognitive and motor control processes.
- Anomalies in this area may result in problems paying attention and coordinating.

Observations

According to research on neuroimaging, people with ADHD may have delayed PFC maturation, decreased gray and white matter volume, and changed connections between different brain regions.^[10]

5.2 Neurotransmitter Systems

- **Dopamine (DA):** Essential for controlling attention, digesting rewards, and inspiring drive. Individuals with ADHD have been found to have lower DA receptor density in many brain areas, most notably the striatum and PFC.
- **Norepinephrine (NE):** Vital for arousal and attention. While particular genetic abnormalities in the NE system are

not well understood, attention and impulse control deficits have been associated with dysfunctions in the $\alpha 2A$ receptor.

5.3 Genetic Factors

- **Genetic Polymorphisms:** Disparities in neurotransmitter dynamics and receptor function can result from variations in genes linked to dopamine receptors (e.g., DRD4, DRD5) and the dopamine transporter (DAT-1). The vulnerability to ADHD could be impacted by certain genetic differences.
- **Mutations:** New research has found particular mutations (such A559V and R615C in DAT-1) that can either enhance or reduce dopamine reuptake, causing some ADHD patients to have elevated dopamine activity.^[10]

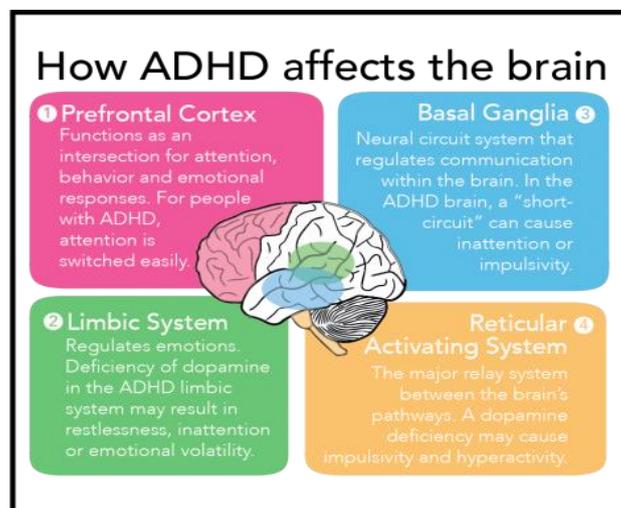
5.4 Hypoactive vs. Hyperactive Systems

- **Hypoactive Dopamine/Norepinephrine Hypothesis:** Hypothesizes that DA and NE activity levels in the PFC are low or not present at all, which may be a factor in impulsivity and inattention, two symptoms of ADHD.
- **Hyperactive Dopamine/Norepinephrine Hypothesis:** Contrary to conventional wisdom, there is data that suggests some persons with ADHD may exhibit an overactive DA or NE response. This duality implies that, depending on the person, ADHD may involve both underactivity and over activity of the neurotransmitter systems.
- **Inverted U-Shaped Dose-Response Curve:** The function of DA and NE may exhibit an inverted U- shaped pattern, whereby neurotransmitter activity levels that are either too high or too low can compromise function. It is clear from this that balance is necessary.^[11]

5.5 Treatment Implications

Medications: Stimulants (e.g., methylphenidate, amphetamines)

- These drugs increase attention and impulsive control by increasing DA and NE transmission, especially in the PFC.
- **Non-Stimulants (e.g., atomoxetine, guanfacine):** While guanfacine stimulates postsynaptic $\alpha 2A$ receptors to promote attention and diminish hyperactivity, atomoxetine preferentially raises levels of NE.
- **Need for Accurate Diagnosis:** Accurate assessment is essential to distinguish ADHD from other disorders and to prevent treating people who do not have ADHD needlessly.



Source: The Appalachian Online
Fig 3: How ADHD affects the brain.

6. Neurobiological mechanisms

6.1 Role of Dopamine: By inhibiting the dopamine transporter (DAT), methylphenidate raises dopamine in the synaptic cleft. A greater dopamine surge occurs in response to reinforcement-valued stimuli. Dopamine probably lessens striatal neurons' random activity, improving the effectiveness of pertinent corticostriatal messages.^[13]

6.2 Noradrenaline's Function: Noradrenaline increases synaptic responses through prefrontal glutamatergic neurons' alpha2A receptors. Noradrenergic medications, such as guanfacine and atomoxetine, enhance working memory, enhance attention, and prevent excessive motor cortex activity.^[8]

6.3 Combined Role of Dopamine and Noradrenaline: Dopamine improves attention by raising the signal-to-noise ratio in the prefrontal cortex (by activating D1 receptors). Noradrenaline modulates the prefrontal network to support inhibitory control and task focus.

6.4 Neurobiological Basis: ADHD is more than just a dopamine deficit; it also involves intricate connections between the noradrenergic and dopaminergic systems. In patients with ADHD, brain imaging reveals reduced activity in the left caudate and right inferior prefrontal cortex, which affects executive functioning and sensory-motor coordination.^[14]

6.5 Executive Function and Brain Activity: Less activity in these regions may be the cause of the impulsivity and hyperactivity seen in ADHD. Frontal cortex and basal ganglia dysfunctions are linked to attention control and inhibitory deficits in ADHD.

➤ **Dopamine Deficiency:** ADHD is linked to dopamine and norepinephrine deficiencies, particularly in the frontal cortex, limbic system, basal ganglia, and reticular activating system (RAS), which affect attention, emotion, and motor control. These neurotransmitter imbalances lead to common ADHD symptoms like sensory overload and difficulty focusing. Prenatal factors like low birth weight can contribute to ADHD, but a supportive environment can reduce their impact. Despite what many people think, sugar does not cause ADHD.^[15]

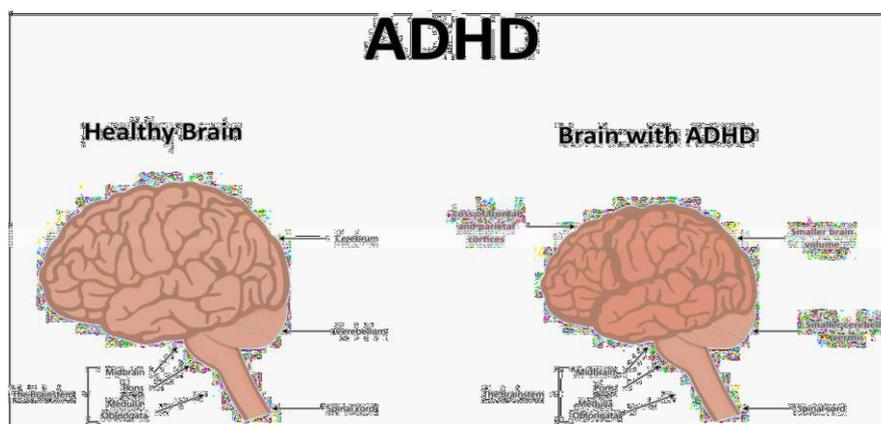


Fig 4: Comparison of healthy brain & brain with ADHD.

7. DIAGNOSIS

7.1 ADHD Diagnosis in Children

A medical professional will carry out the following procedures in order to diagnose a child with ADHD:

- Conduct interviews with the child's guardians, teachers, and mental health professionals regarding any behavioral or academic issues (e.g., difficulties keeping friends or maintaining grades).
- Examine the child's symptoms using instruments like behavior rating measures or checklists to make that the DSM-5

requirements are satisfied for an ADHD diagnosis.^[17]

- Perform a comprehensive physical assessment and request laboratory or other testing to rule out illnesses such as lead poisoning, thyroid issues, sleep disorders, or seizure disorders that present with similar symptoms.^[13]
- Do additional screenings for co-occurring mental health problems or other mental health issues, such as conduct disorder, oppositional defiant disorder, depression, anxiety, learning and language disorders, autism spectrum disorder, and tic disorders.^[18]

You might also require a referral to consult a paediatrician for further testing for problems including learning difficulties or developmental disorders, depending on the child's symptoms.^[19]

7.2 ADHD Diagnosis in Adults

The procedure for getting an ADHD diagnosis is comparable for adults. A medical professional will accomplish the following during your visit:

- Conduct a history and physical examination to learn more about your symptoms.
- Use diagnostic instruments including behavioral rating scales and symptom checklists to evaluate your symptoms in accordance with DSM-5 criteria.
- In certain situations, ask to speak with your partner, parent, close friend, or other people for further interviews.
- Perform a physical examination to rule out further possible reasons for the symptoms.
- Examine for co-occurring mental health conditions or other illnesses, such as personality disorders, dissociative disorders, mood disorders, or anxiety disorders.^[13]

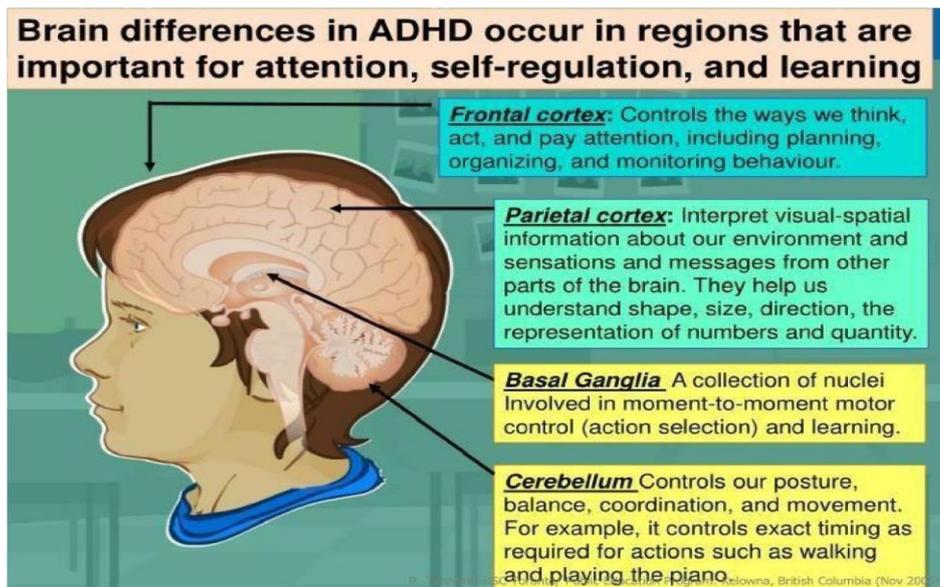


Fig 5: Regions of Brain.

TEST

• Tests for ADHD

An interview and physical examination are the gold-standard methods for diagnosing ADHD and other possible mental and physical health issues.

While there are a number of tests for ADHD that you may be aware of, an MRI, PET, or CT scan alone is not currently sufficient to diagnose the disorder. To rule out other medical issues, your doctor can suggest blood testing, brain imaging tests, or an electroencephalogram.

An X-ray or blood test cannot be used to diagnose attention-deficit hyperactivity disorder (ADHD). Rather, an assessment procedure is employed by a medical practitioner to identify ADHD.

The criteria are taken from the Diagnostic and Statistical Manual of Mental Disorders (DSM), which is the standard diagnostic guide used in the US. Both adults and children can be diagnosed with ADHD using these tests.^[20]

When testing for ADHD, some of the particular tests that may be employed includes

- **Behavior Assessment System for Children (BASC):** Searches for signs of anxiety, depression, conduct issues, hyperactivity, attention disorders, and learning disabilities.
- **Conners Rating Scale:** This tool, which is also available as the Conners Adult ADHD Rating Scales to evaluate ADHD in adults, examines symptoms pertaining to behavior, school, interpersonal functioning, and work to ascertain how symptoms affect relationships, home life, academics, and other areas of life.
- **Child Behavior Checklist/Teacher Report Form (CBCL):** This form is used to evaluate social and behavioral problems, such as withdrawal, physical complaints, and hostility.
- **Tests of Variable Attention (TOVA):** Usually used in conjunction with other examinations, TOVAs measure an individual's capacity to focus on things that they do not particularly enjoy.
- **Adult ADHD Self-Report Scale (ASRS):** An assessment that adults can take to determine whether they have ADHD symptoms.

Health practitioners can use the Neuropsychiatric EEG-Based Assessment Aid (NEBA) System in addition to self-report and interview-based assessments. Brain wave patterns, which are often higher in children with ADHD, are measured in this process. Children six years old and older may use this ADHD exam.^{[13][21]}

8. WHAT ARE THE EFFECTIVE TREATMENTS FOR ADHD?

- **Medications:** Stimulants, such as amphetamines and methylphenidate, increase norepinephrine and dopamine levels, which enhance concentration and focus. Non-stimulants, such as guanfacine and atomoxetine, work on norepinephrine to help control attention and impulse control.
- **Behavioral Therapy:** Aids in the reduction of impulsive behavior, time management, and coping strategy development of persons.
- **Parent Training and Education:** Parents pick up techniques for controlling their kids' conduct, laying out clear expectations, and offering encouragement.
- **Lifestyle Changes:** Structured routines, a good diet, and regular exercise can all help control the symptoms of ADHD.^[21]

Therapy or medication can be used to treat ADHD, but a combination of the two is frequently most effective.

8.1 Medicine : Five different kinds of medications are approved to treat ADHD

- Methylphenidate Hydrochloride.
- Lisdexamfetamine Hydrochloride.
- Dexamfetamine Hydrochloride.
- Atomoxetine Hydrochloride.
- Guanfacine Hydrochloride.

While there is no long-term treatment for ADHD, these medications may improve concentration, reduce impulsivity, promote calmness, and facilitate the acquisition and application of new abilities.^[3]

8.1.1 Methylphenidate Hydrochloride

The medication for ADHD that is most frequently used is methylphenidate. It is a member of the class of medications known as stimulants, which function by boosting brain activity, especially in regions involved in attention and behavior regulation. ADHD-afflicted adults, teenagers, and kids older than five may be prescribed methylphenidate.

The medication comes in two forms: modified-release pills, which are taken once daily in the morning and release their dose gradually throughout the day, or immediate-release tablets, which are given in small quantities two to three times a day.

8.1.2 Lis dexamfetamine Hydrochloride

A medication called lisdexamfetamine excites specific areas of the brain. It lessens impulsive behavior, increases focus and concentration, and enhances concentration. If methylphenidate treatment for ADHD has not been helpful after at least six weeks. Lisdexamfetamine is taken once daily in the form of capsules.

8.1.3 Dexamfetamine Hydrochloride

Lisdexamfetamine and dexamfetamine function similarly and are comparable drugs. It may be made available to ADHD-afflicted adults, teenagers, and kids older than five. Usually used as a tablet two to four times a day, dexamfetamine also comes in an oral form.

8.1.4 Atomoxetine Hydrochloride

Atomoxetine behaves differently from other ADHD drugs.

It is an inhibitor of selective noradrenaline reuptake (SNRI), which increases brain noradrenaline levels. Increasing this chemical can aid with impulse control and focus since it facilitates the transmission of messages between brain cells. If methylphenidate or lisdexamfetamine is not practical, atomoxetine may be prescribed to adults, teenagers, and children older than five. It is also approved for use in adults if adult ADHD symptoms are confirmed. Atomoxetine is typically used once or twice daily in pill form.

8.2 Guanfacine Hydrochloride

Guanfacine lowers blood pressure and enhances attention by working on a portion of the brain. If methylphenidate or lisdexamfetamine cannot be used, it may be given to children and teenagers older than five. Usually, one tablet of guanfacine is taken either in the morning or in the evening.

8.3 Behaviour therapy

Parents and teachers may participate in behaviour therapy, which offers assistance to caregivers of children with ADHD. Behaviour management, which employs a system of rewards to motivate your child to attempt to control their ADHD, is typically a part of behaviour treatment. You can recognize which behaviours, like eating at the table, you want to support if your child has ADHD. Then, as a modest incentive for their good behaviour, your child receives something. Teachers must learn how to organize and schedule activities, as well as how to recognize and support students for even the smallest accomplishments, in order to effectively control behavior.^[25]

8.4 Parent training and education programmes

You can learn specific strategies to play with and talk to your child to enhance their attention and behaviour if they have ADHD. Specialized parent education and training programs can assist you in this regard. Additionally, you may be offered parent education prior to your child receiving a formal ADHD diagnosis. Groups of ten to twelve parents are typically assigned to these programs. A typical program includes 10 to 16 meetings, each lasting up to two hours. Receiving an offer for a parent education and training program does not indicate that you are a terrible parent; on the contrary, it is meant to provide parents and caregivers with further knowledge on behaviour management, boost their self-esteem, and strengthen their bond with their children.^[26]

8.5 Social skills training

Your child will participate in role-playing exercises as part of social skills training, which teaches them social manners by seeing how their actions impact other people.

8.6 Cognitive behavioural therapy (CBT)

CBT is a talking therapy that can assist you in managing your issues by altering your thoughts and actions. A therapist would work to alter your or your child's feelings about a circumstance, which could alter how they behave. CBT can be done in a group setting or one-on-one with a therapist.

8.7 Other possible treatments

There are other ways of treating ADHD that some people with the condition find helpful, such as cutting out certain foods and taking supplements. However, there's no strong evidence this work, and they should not be attempted without medical advice.^[27]

I. Diet

A balanced, healthful diet is recommended for those with ADHD. Don't stop eating before consulting a doctor. Some people might observe a connection between food varieties and worse symptoms of ADHD. If so, record your food and drink intake as well as any subsequent behaviour in a journal. Talk about this with your general practitioner (GP), who might recommend a nutritionist (a medical specialist with expertise in nutrition).

II. Supplements

Some studies have suggested that supplements of omega-3 and omega-6 fatty acids may be beneficial for people with ADHD, although the evidence supporting this is very limited. Before taking any supplements, it is advised to see a doctor because some may interact with medications in unpredictable ways or reduce their effectiveness additionally, keep in mind that some supplements can reach harmful amounts in your body and should not be taken for an extended

period of time.^[27]

9. CHALLENGES

9.1 Adult ADHD Challenges

Many adults who suffer from ADHD are unaware that they have it. Living with undiagnosed ADHD in adulthood can make managing work, school, and other responsibilities much more difficult.

9.1.1 Challenges in School

As an adult with ADHD, attending school, college, or university presents a unique set of difficulties, such as

- Difficulties with project, homework, or assignment deadlines; inability to concentrate in lectures, classes, or exams, which could result in subpar scores.
- Erratic routines, which include unpredictable eating and sleeping hours
- A lack of confidence in oneself and trouble controlling emotions like tension and worry
- A low sense of self-worth and a strong sense of dissatisfaction with academic achievement
- Having trouble collaborating with peers on group tasks
- Frequently alone and avoiding social encounters with peers.^[20]

9.1.2 Challenges at Work

Adults with ADHD could have trouble at work. These challenges could include:

- Having trouble maintaining a full-time job.
- Having trouble finding employment. Dealing with discrimination at work.
- Changing jobs regularly.
- Having trouble finishing assignments on time and meeting deadlines.
- Missing important deadlines, appointments, or assignment details.
- Finding it difficult to follow instructions or pay attention to details.^[28]

9.1.3 Relationship Challenges

- It can be challenging for someone with ADHD to maintain positive relationships with friends, family, or a partner.
- During talks, they could struggle with issues like, Not listening well enough to make the other person feel ignored.
- Unintentionally making harmful remarks when pressed for time.
- Having problems keeping in mind significant dates, including birthdays and anniversaries.
- Temper tantrums and trouble having calm conversations about disagreements, which results in unsolved problems.
- Finding it difficult to finish tasks, which makes partners angry when you pick up the slack.
- Even yet, someone with ADHD has the potential to be an excellent friend, spouse, or parent.
- Building enduring, healthy relationships with the people you love can be facilitated by learning constructive communication, conflict resolution, and obstacle-overcoming techniques.
- You and your spouse may find it helpful to develop workable plans for keeping your joyful ADHD relationship through counseling or couple's therapy.^[29]

10. ADVANCES

The US Food and Drug Administration (FDA) recently approved two medications for treating attention-deficit/hyperactivity disorder (ADHD) in children that address some of the frequent problems with conventional stimulant therapies.

10.1 Delayed-Release Stimulant

- The FDA approved methylphenidate hydrochloride (Jornay PM), a delayed-release/extended-release methylphenidate, in 2018, and it went on sale in 2019. It is administered earlier in the evening, precisely between 6:30 and 9:30 pm, in contrast to other methylphenidate-based stimulants, so that it starts working as soon as the child wakes up in the morning.^[30]



Fig 6: New treatment option for ADHD.

10.2 Nonstimulant Medication

In April 2021, the FDA approved viloxazine (Sebree) for treating ADHD in children aged 6 to 17. Like Strattera, Sebree is a selective norepinephrine reuptake inhibitor (SNRI). These medications, along with other nonstimulant options like clonidine (Kavya) and guanfacine (Intune), are available for families who prefer not to use stimulants or are concerned about substance abuse.

Sebree and Strattera, like other SNRIs used for depression, have a warning about a small risk of increased suicidal thoughts, especially in teens, during the first few months of treatment. Nevertheless, these drugs frequently have more advantages than disadvantages. Although nonstimulants are generally less effective than stimulants for ADHD, combining both types of medication may help patients who don't respond well to one alone.^{[30][11]}

10.3 Devices and Digital Therapeutics

Additionally, the FDA recently approved two devices to treat youngsters with ADHD. Clinicians should be aware that FDA The trigeminal nerve stimulator sits on the face. Approximately half of paediatric ADHD patients reacted to using this device, according to a small-scale study that used data from the device maker. The FDA has also authorised the use of the video game Endeavour to treat ADHD under the digital therapies category. The game's motor demands and sensory stimuli target the neurological networks that control attention and focus. Studies sponsored by the device's manufacturer suggest that the prescribed use of the game improves attention and has few adverse effects.

Either or both of these devices may prove to be valuable adjuncts to medication and behaviour management. More evidence of effectiveness would be helpful in guiding clinical decisions.^[31]

Table No 1: Medication of ADHD.^{[30][31]}

STIMULANT MEDICATIONS	NON-STIMULANT MEDICATIONS
A. Amphetamine-based stimulants	Atomoxetine (Strattera)
1. Lisdexamfetamine (Vyvanse)	Guanfacine (Intuniv)
2. Dextroamphetamine (Dexedrine, ProCentra)	Clonidine (Kapvay)
3. Mixed amphetamine salts (Adderall, Adderall XR)	Bupropion (Wellbutrin)
B. Methylphenidate-based stimulants	Modafinil (Provigil)
1. Methylphenidate (Ritalin, Concerta, Metadate)	
2. Dexmethylphenidate (Focalin, Focalin XR)	

RATIONAL OF WORK

AIM

The aim of a review on ADHD (Attention-Deficit/Hyperactivity Disorder) is typically to summarize and evaluate the current understanding of the disorder, including its symptoms, causes, diagnostic criteria, and treatment options. The review may also aim to highlight recent research findings, identify gaps in knowledge, and suggest directions for future research or clinical practice.

OBJECTIVES

The objectives of an ADHD (attention deficit hyperactivity disorder) review typically focus on the following areas:

- Symptom Assessment:** Evaluate ADHD symptoms' impact on daily life.
- Treatment Review:** Assess effectiveness, side effects, and compliance with medications or therapies.
- Support Systems:** Identify additional support like counseling, school/work accommodations, or groups.
- Comorbidities:** Screen for coexisting conditions like anxiety or depression.
- Functional Impact:** Review how ADHD affects work, school, and relationships.
- Education:** Provide resources and strategies to help individuals and families manage ADHD.
- Goal Setting:** Set goals for symptom management and quality of life improvements.
- Lifestyle Interventions:** Consider behavioral therapy, exercise, and other non-medication strategies.

CONCLUSION

ADHD (Attention-Deficit Hyperactivity Disorder) is a complex disorder that affects individuals throughout their lives, impacting their ability to function in school, work, and social settings. Diagnosis relies mainly on observing behaviour since there are no specific tests. While research has improved our understanding of ADHD's causes, the subjective nature of diagnosis and the presence of other related conditions can make it challenging to assess. Developing more precise diagnostic standards that take into consideration ADHD's multiple manifestations at different ages is essential since the disorder is becoming more widely acknowledged as a lifelong disease. In order to improve the quality of life for people with ADHD, more research is required to improve diagnosis techniques and assistance.

FUTURE SCOPE

- Neurobiological Research:** Discovering biological markers could lead to tests that support behavioural assessments, improving diagnosis.
- Refining Diagnostic Criteria:** Updating guidelines to better reflect ADHD symptoms in different age groups,

especially adults.

3. Technology Integration: Using apps and wearables to track symptoms in real-time for more accurate assessments.
4. Personalized Treatments: Developing tailored treatment plans based on individual symptoms and needs.
5. Addressing Comorbidities: Focusing on related conditions like anxiety and depression to enhance overall care.
6. Provider Training: Improving training for healthcare professionals to better recognize and manage ADHD.
7. Public Awareness: Raising awareness about ADHD to reduce stigma and encourage people to seek help.
8. Long-Term Research: Conducting studies to understand ADHD's long-term effects and improve treatment strategies.

These advancements aim to enhance diagnosis and support for individuals with ADHD, leading to better outcomes.

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