International Consensus Statement of ADHD

Methods

Easy-to-Understand Summary of the Methods Section

The International Consensus Statement on ADHD was updated to include new scientific findings from the past 20 years. This update was done by carefully reviewing and selecting high-quality studies.

Expert Involvement

A group of experts from different organizations that study and treat ADHD worked together on this project. These organizations include:

- The World Federation of ADHD
- European Network for Hyperkinetic Disorders (Eunethydis)
- The American Professional Society of ADHD and Related Disorders
- The Canadian ADHD Resource Alliance
- The Asian Federation of ADHD
- The Latin American League of ADHD
- The Australian ADHD Professionals Association
- The Israeli Society of ADHD
- The Saudi ADHD Society
- Neurodevelopmental Disorders Across Lifespan section of the European Psychiatric Association
- The ADHD Guidelines Group of the Association of Medical Scientific Societies in Germany
- The ADHD Network of European College of Neuropsychopharmacology
- The Chinese Society of Child and Adolescent Psychiatry
- The ADHD Section of the World Psychiatric Association

Finding the Right Studies

To find the best studies, researchers looked at a large medical database called PubMed. They used specific search terms to find:

- **Large Studies**: These studies looked at ADHD in big groups of people, usually more than 2000 participants.
- **Meta-Analyses**: These studies combined results from many smaller studies to get more reliable conclusions.

They made sure to exclude studies that were just reviews or those with small sample sizes. They also avoided treatment studies that didn't compare ADHD treatments properly.

Criteria for Including Studies

To make sure the information was strong, they only used studies that:

- Had results from five or more smaller studies or included data from at least 2000 people.
- Clearly showed how strong the effects of ADHD and its treatments were.

They used specific terms to describe the strength of the effects:

- **Small Effect**: Hard to notice in one person but important if it affects many people.
- **Medium Effect**: Noticeable to someone paying close attention.
- **Large Effect**: Clearly important and makes a big difference.

By using these strict rules, the experts ensured that the statements in the updated Consensus Statement were based on reliable and strong evidence. This helps reduce misunderstandings and the stigma around ADHD.

A Brief History: ADHD is Not a New Disorder

The concept of ADHD has been around for a long time, with its symptoms being noted in medical literature for over two centuries. Although the term "ADHD" wasn't used back then, descriptions of behaviors that we now associate with ADHD were documented. Here are some key points from the early history of ADHD:

1. **1775**: Melchior Adam Weikard, a German physician, was the first to write about a disorder that had symptoms similar to ADHD in a textbook.
2. **1798**: Alexander Crichton, a physician from the Royal College of Physicians in the UK, described a similar disorder in a medical textbook.
3. **1845**: Heinrich Hoffmann, who later became the head of the first psychiatric hospital in Frankfurt, Germany, wrote a children's book that described hyperactivity and attention deficits, showing ADHD-like behaviors.
4. **1887-1901**: Several French medical and educational writers, including Désiré-Magloire Bourneville, Charles Boulanger, Georges Paul-Boncour, and Jean Philippe, described behaviors that were similar to ADHD.
5. **1902**: George Still, a physician in the UK, provided the first scientific journal description of the disorder.
6. **1907**: Augusto Vidal Perera wrote the first Spanish book on child psychiatry, discussing the impact of inattention and hyperactivity among schoolchildren.
7. **1917**: Spanish neurologist and psychiatrist Gonzalo Rodriguez-Lafora described ADHD symptoms in children, suggesting they were due to a brain disorder with genetic origins.

8. **1932**: Franz Kramer and Hans Pollnow from Germany described an ADHD-like syndrome and coined the term “hyperkinetic disorder,” later used by the World Health Organization.
9. **1937**: Charles Bradley in the USA discovered that amphetamine medication reduced ADHD-like symptoms.
10. **1940s**: Symptoms similar to ADHD in children were described as "minimal brain dysfunction."
11. **1956-1958**: Studies began to suggest that behaviors related to minimal brain dysfunction could persist into adulthood.
12. **1960s**: The U.S. Food and Drug Administration approved methylphenidate (Ritalin) for behavioral disorders in children.
13. **1970s to Today**: Diagnostic criteria for ADHD have evolved, based on research showing that the diagnosis can predict treatment response, the clinical course of the disorder, and its family history.

This historical perspective shows that ADHD has been recognized in various forms for a long time, highlighting its consistent presence across different eras and cultures.

How is ADHD Diagnosed?

ADHD is diagnosed through a comprehensive evaluation by a licensed clinician. This evaluation includes interviews with the parent or caregiver and the patient to document the criteria for ADHD. Here’s a simplified overview of the process:

Key Steps in Diagnosis

1. **Professional Evaluation**
    - **Who Can Diagnose:** Only a licensed clinician, such as a psychologist, psychiatrist, or other qualified healthcare professional, can diagnose ADHD.
    - **Interview Process:** The clinician conducts interviews with the parent, caregiver, and/or the patient to understand their symptoms and how they affect daily life.
2. **Assessment Tools**
    - **Not Based on Tests:** ADHD cannot be diagnosed using rating scales, neuropsychological tests, or brain imaging alone. These tools can provide supportive information but are not definitive for diagnosis.
    - **Detailed History:** The clinician gathers a detailed history of the patient's behavior, development, and environment. This includes medical history, family history of mental health issues, academic performance, and social interactions.
3. **Criteria for Diagnosis**
    - **Duration and Settings:** Symptoms must be present for at least six months and occur in multiple settings, such as both at home and school.

- **Impact on Life:** The symptoms must cause significant impairment in social, academic, or occupational functioning.
- **Early Onset:** Some symptoms must have been present before the age of 12.
- **Exclusion of Other Causes:** Other mental health disorders must be ruled out as the primary cause of the symptoms.

4. **Addressing Criticisms**
    - **Validity of Diagnosis:** ADHD is often criticized for being a subjective diagnosis since it lacks a biological test. However, it meets standard criteria for the validity of a mental disorder because:
        - **Agreement Among Professionals:** Well-trained professionals across different settings and cultures agree on the diagnosis using well-defined criteria.
        - **Predictive Value:** The diagnosis helps predict other problems the patient may have, future outcomes, response to treatments, and underlying causes indicated by genetics or brain imaging.
5. **Professional Guidelines**
    - **Endorsements:** Professional associations have developed and endorsed guidelines for diagnosing ADHD, ensuring a standardized approach across various healthcare settings.

By following these steps, clinicians can accurately diagnose ADHD, helping ensure that individuals receive appropriate treatment and support for managing their symptoms .

Diagnosing ADHD involves several important steps and criteria to ensure an accurate assessment.

Criteria for Diagnosis

- **Symptoms:** The diagnosis requires symptoms of hyperactivity-impulsivity and/or inattention that are not appropriate for the child's age and have lasted at least six months.
- **Settings:** These symptoms must be present in more than one setting, such as both home and school.
- **Impairments:** The symptoms must cause significant problems in daily life.
- **Age of Onset:** Some of these symptoms should have been present in early childhood.
- **Exclusion of Other Disorders:** The symptoms should not be better explained by another mental disorder.

Types of ADHD

- **Presentations:** ADHD can be categorized into three types: primarily inattentive, primarily hyperactive-impulsive, or combined.
- **Associated Issues:** Inattentive symptoms are often linked to academic struggles and low self-esteem, while hyperactive-impulsive symptoms can lead to peer rejection and risky behaviors.

ADHD in Intelligent Individuals

- **Intelligence:** ADHD can affect highly intelligent people too. Studies show that children with high IQs who have ADHD experience similar rates of learning disorders, psychiatric issues, and substance abuse as those with average or low IQs.

Adolescence and Adulthood

- **Continuation:** Many individuals who were diagnosed with ADHD in childhood continue to experience symptoms and impairments into adolescence and young adulthood.

Importance of a Comprehensive Evaluation

- **Evaluation Process:** A thorough evaluation by a licensed clinician is crucial for an accurate diagnosis. This involves interviews with the patient and their caregivers, along with gathering detailed histories and possibly using standardized rating scales.

This structured approach helps clinicians make a reliable diagnosis, ensuring that individuals with ADHD receive the appropriate support and treatment they need.

How Common is ADHD?

ADHD, or Attention-Deficit/Hyperactivity Disorder, is a condition that affects people all around the world. It is more frequently diagnosed in boys than in girls. Over the last thirty years, the actual number of people with ADHD hasn't really changed, but doctors have become better at recognizing and diagnosing it.

Here are some important points:

- About 5.9% of young people (kids and teenagers) have ADHD.
- Studies have shown that this rate is pretty much the same no matter where you are in the world – North America, Europe, Asia, Africa, South America, or Oceania.
- In adults, about 2.8% have ADHD. This percentage is lower than in kids because some people with ADHD as children no longer meet the full criteria for the disorder when they become adults.
- ADHD is more common in boys than in girls and boys with ADHD are more likely than girls with ADHD to be referred for treatment.
- In adults, about 2.5% have ADHD according to one analysis, while another estimated that 2.8% of adults have ADHD. This lower rate in adults compared to youths is consistent with findings that only about one in six youths with ADHD still meet full criteria for the disorder by age 25. About half of these adults show some ongoing symptoms, but not enough to meet the full criteria for ADHD.
- In older adults, a study found that about 2.2% of people over 50 show symptoms of ADHD based on rating scales, but this drops to 1.5% when using stricter criteria. When looking at clinical diagnoses of ADHD, the rate drops further to 0.2% for those over 50. Another study found that only 0.02% of those over 50 receive treatment for ADHD.

Even though the prevalence of ADHD (how common it is) hasn't changed much, the number of diagnoses has gone up. This increase is mostly because doctors and healthcare systems have gotten better at identifying and diagnosing ADHD.

Genetic Causes of ADHD

For most people with ADHD, a mix of genetic and environmental factors come together to cause the disorder. Environmental risks, such as things happening during pregnancy or early childhood, can play a big role. In rare cases, ADHD-like symptoms might come from severe neglect, a single genetic issue, or a head injury early in life.

These findings help us understand what might lead to ADHD, but they don't help diagnose it. While there's strong evidence that environmental factors are linked to ADHD, it's often hard to tell if these factors directly cause the disorder or if they are just related to genetic influences. That's why we call these environmental factors "correlates" instead of direct causes. The genetic and environmental risks mentioned here can also be linked to other disorders, not just ADHD.

ADHD is strongly influenced by genetics, meaning it often runs in families. Studies of twins show that both genetic factors and the interplay between genes and the environment play a major role in causing ADHD.

Researchers have identified many genetic variants that increase the risk for ADHD. These genetic factors are known as "polygenic," meaning that many small genetic differences combine to affect the likelihood of developing the disorder. This polygenic risk can also influence related issues like anxiety and depression.

Some cases of ADHD are caused by rare genetic mutations or abnormalities in the chromosomes. For example, children with ADHD and autism spectrum disorder often have more rare genetic mutations compared to those without these conditions.

Genetic studies show that ADHD shares genetic links with many other psychiatric and physical disorders, such as schizophrenia, depression, bipolar disorder, autism spectrum disorder, conduct disorder, eating disorders, substance use disorders, migraines, and obesity. However, ADHD also has its own unique genetic risks.

Large family studies indicate that ADHD shares genetic or familial causes with autoimmune diseases, certain birth defects, and intellectual disabilities. This means that the genetic factors influencing ADHD can also affect the risk of developing these other conditions.

Environmental Correlates of ADHD: Exposure to Toxicants

Research has found several environmental factors that might increase the risk of developing ADHD, especially exposure to certain toxic substances. These have not been confirmed as causes of ADHD.

Studies show that higher levels of lead in the blood are linked to an increased risk of ADHD. For example, children with high lead levels are more likely to have ADHD compared to those with low lead levels.

Prenatal exposure to smoking has been associated with a higher chance of children developing ADHD. However, this link may be influenced by genetic factors that make families more likely to both smoke and have ADHD.

Exposure to secondhand smoke during childhood also raises the likelihood of developing ADHD. Children who are exposed to more secondhand smoke are at a higher risk.

Artificial food dyes have been linked to a slight increase in hyperactivity in some children. However, the effect is generally small and varies between individuals.

Prenatal exposure to acetaminophen (a common pain reliever) has been associated with a higher risk of ADHD in children. The more the mother used acetaminophen during pregnancy, the higher the risk.

Exposure to certain chemicals like phthalates, used in plastics, and organophosphate pesticides, used in agriculture, has been linked to an increased risk of ADHD. Children exposed to high levels of these chemicals are more likely to develop ADHD.

Air pollution, specifically higher levels of pollutants like nitrogen dioxide and particulate matter, has also been associated with an increased number of ADHD-related hospital admissions among adolescents.

In summary, exposure to various environmental toxicants, such as lead, cigarette smoke, certain chemicals, and air pollutants, can increase the risk of developing ADHD. These findings highlight the importance of reducing exposure to these harmful substances to help lower the risk of ADHD.

Environmental Correlates of ADHD: Nutrient Deficiencies

Research has found that certain nutrient deficiencies can be linked to ADHD.

Studies have shown that children with ADHD often have lower levels of serum ferritin, a protein that stores iron, even though their overall iron levels are normal. This could affect their energy levels and brain function.

Children with ADHD also tend to have lower levels of omega-3 fatty acids in their blood compared to children without ADHD. Omega-3s are important for brain health and development.

Another study found that children whose mothers had low levels of vitamin D during pregnancy were more likely to develop ADHD. Vitamin D is crucial for brain development and overall health.

Environmental Correlates of ADHD: Events During Pregnancy and Birth

Research shows that certain events during pregnancy and birth can increase the risk of developing ADHD.

Babies born very early (preterm) or with very low birth weight have a higher chance of having ADHD. One study found that these babies are three times more likely to develop ADHD. Another large study confirmed that lower birth weight is linked to a higher risk of ADHD.

If a mother has high blood pressure during pregnancy, her child is more likely to develop ADHD. The risk is higher if the baby is small for its gestational age and the mother has a condition called preeclampsia, which involves high blood pressure and other symptoms.

Children born to mothers who were obese before pregnancy are more likely to develop ADHD. This risk is higher for children whose mothers were severely obese.

Thyroid problems in mothers during pregnancy can also affect the risk. Both hyperthyroidism (overactive thyroid) and hypothyroidism (underactive thyroid) in pregnant women are slightly linked to a higher chance of their children developing ADHD.

Environmental Correlates of ADHD: Deprivation, Stress, Infection, Poverty, and Trauma

Research shows that various challenging life circumstances and experiences can increase the risk of developing ADHD.

A study in Taiwan found that children who had a specific type of viral infection (enterovirus) were 25% more likely to develop ADHD.

Another study in Denmark showed that boys whose mothers experienced the loss of a close relative during pregnancy were twice as likely to develop ADHD.

In the United States, a study found that children who experienced sexual abuse or physical neglect had a higher chance of developing the inattentive type of ADHD.

Lower family income is also linked to a higher risk of ADHD. This was found in studies from South Korea and Sweden, even after accounting for genetic and family factors.

Other studies show that children who grow up in difficult family situations, such as having parents with mental disorders or criminal records, are more likely to develop ADHD. These challenging circumstances can include being placed in foster care, living in low social class conditions, or experiencing severe marital discord in the family.

Lastly, studies have shown that social disadvantages, like parents having low educational levels, being unemployed, or living in poverty, increase the risk of ADHD in children. The more these disadvantages accumulate, the higher the risk.

In summary, difficult life circumstances and stressful events during childhood, such as infections, poverty, trauma, and family problems, can increase the risk of developing ADHD.

What Have We Learned from Studying the Brains of People with ADHD?

Research on the brains of people with ADHD has provided important insights into the disorder. There are two main types of studies: those that look at performance on psychological tests and those that examine brain structure and function using imaging techniques.

First, studies on psychological tests show that people with ADHD often perform differently on tasks that measure mental processes. For example, they may have lower scores on IQ tests and academic skills like reading, spelling, and arithmetic. They also tend to have more trouble with tasks that require abstract problem solving, working memory, focused attention, sustained attention, and verbal memory. Additionally, people with ADHD are more likely to make cognitive errors, prefer immediate rewards over larger delayed ones, and show more impulsive decision-making.

Second, brain imaging studies have found small differences in brain structure and function between people with and without ADHD. These differences include slightly smaller brain volumes in certain areas,

such as the frontal, cingulate, and temporal regions, as well as the basal ganglia, amygdala, and hippocampus. Functional MRI studies show that people with ADHD have less activation in brain regions involved in inhibitory control, like the right inferior frontal cortex and basal ganglia.

Overall, while these brain differences are significant for understanding ADHD, they are not large enough to be used for diagnosing the disorder. Additionally, some of these brain differences may diminish or change as individuals with ADHD grow older. This research helps us understand how ADHD affects the brain, but it also highlights the need for further studies to fully grasp the complex nature of the disorder.

Performance Deficits in Psychological Processes

Research has shown that people with ADHD often face challenges in various mental processes, impacting their daily functioning.

Individuals with ADHD typically have slightly lower IQ scores compared to those without ADHD, affecting their academic performance. Studies indicate that they perform worse in reading, spelling, and arithmetic. However, in adults, the IQ deficits are generally small and not very significant.

People with ADHD struggle with abstract problem solving and working memory, which means they have difficulty handling tasks that require holding and manipulating information in their mind. They also have trouble focusing their attention on a specific task (focused attention) and keeping their attention sustained over time (sustained attention). Additionally, their ability to remember verbal information (verbal memory) is often impaired. These individuals are also more prone to making cognitive errors known as "rule violations," where they fail to follow established rules or guidelines.

A notable characteristic of ADHD is the tendency to prefer smaller immediate rewards over larger delayed ones. This behavior, known as impulsive decision-making, reflects a difficulty in delaying gratification. Individuals with ADHD are also more likely to make risky decisions, which can lead to negative consequences.

A comprehensive analysis that included 34 meta-analyses found that people with ADHD have moderate impairments in several cognitive domains. These include working memory, reaction time variability, response inhibition (the ability to suppress inappropriate actions), planning, and organization. These impairments are generally more pronounced in children and adolescents than in adults, indicating that cognitive deficits related to ADHD may improve with age but can still persist into adulthood.

Specific studies have shown that children with ADHD have moderate impairments in working memory, which tend to improve as they get older. Additionally, there are no significant differences in ADHD symptoms between boys and girls, indicating that both sexes experience similar cognitive challenges.

Cognitive training has shown some promise in improving certain aspects of cognitive function in young children with ADHD. For instance, cognitive training programs have been found to moderately improve working memory and inhibitory control (the ability to control impulsive responses) in preschoolers.

In summary, ADHD affects various aspects of cognitive function, including problem-solving, memory, attention, and decision-making. These cognitive impairments can vary in severity but are generally more noticeable in younger individuals. While some cognitive deficits may improve over time, many individuals with ADHD continue to experience challenges into adulthood.

Differences in the Brain Found by Neuroimaging Studies

Research using brain scans has found some small differences in the brains of people with ADHD compared to those without the disorder.

Studies using MRI scans show that children with ADHD have slightly smaller brain areas in regions like the frontal, cingulate, and temporal lobes. These children also have smaller structures in the brain like the basal ganglia, amygdala, and hippocampus. However, these differences are very small and are not seen in teenagers or adults with ADHD.

Comparisons between people with ADHD and those with other disorders show that ADHD is linked to reduced gray matter in areas like the basal ganglia and insula. For instance, people with ADHD have smaller hippocampal volumes compared to those with obsessive-compulsive disorder (OCD) and smaller overall brain volume compared to those with autism spectrum disorder (ASD) and OCD.

Functional MRI (fMRI) studies, which look at brain activity, show that people with ADHD have less activation in brain regions responsible for controlling impulses, like the right inferior frontal cortex and basal ganglia. These areas do not work as strongly during tasks requiring focus and control.

Another type of brain scan, diffusion tensor imaging (DTI), found differences in the white matter of people with ADHD. White matter is important for connecting different parts of the brain. The differences suggest that the connections between the two sides of the brain, especially in areas important for attention and perception, might not work as well in people with ADHD.

In summary, brain imaging studies have found small structural and functional differences in the brains of people with ADHD. These differences are mainly in areas related to attention and control. However, these changes are not big enough to be used to diagnose ADHD on their own.