

= Attention deficit hyperactivity disorder =

Attention deficit hyperactivity disorder (ADHD) is a mental disorder of the neurodevelopmental type . It is characterized by problems paying attention , excessive activity , or difficulty controlling behavior which is not appropriate for a person 's age . These symptoms begin by age six to twelve , are present for more than six months , and cause problems in at least two settings (such as school , home , or recreational activities) . In children , problems paying attention may result in poor school performance . Although it causes impairment , particularly in modern society , many children have a good attention span for tasks they find interesting .

Despite being the most commonly studied and diagnosed mental disorder in children and adolescents , the cause is unknown in the majority of cases . The World Health Organization (WHO) estimated that it affected about 39 million people as of 2013 . It affects about 5 ? 7 % of children when diagnosed via the DSM @-@ IV criteria and 1 ? 2 % when diagnosed via the ICD @-@ 10 criteria . Rates are similar between countries and depend mostly on how it is diagnosed . ADHD is diagnosed approximately three times more in boys than in girls . About 30 ? 50 % of people diagnosed in childhood continue to have symptoms into adulthood and between 2 ? 5 % of adults have the condition . The condition can be difficult to tell apart from other disorders as well as to distinguish from high levels of activity that are still within the normal @-@ range .

ADHD management recommendations vary by country and usually involve some combination of counseling , lifestyle changes , and medications . The British guideline only recommends medications as a first @-@ line treatment in children who have severe symptoms and for medication to be considered in those with moderate symptoms who either refuse or fail to improve with counseling . Canadian and American guidelines recommend that medications and behavioral therapy be used together as a first @-@ line therapy , except in preschool @-@ aged children . Stimulant therapy is not recommended as a first @-@ line therapy in preschool @-@ aged children in either guideline . Treatment with stimulants is effective for up to 14 months ; however , its long term effectiveness is unclear . Adolescents and adults tend to develop coping skills which make up for some or all of their impairments .

The medical literature has described symptoms similar to ADHD since the 19th century . ADHD , its diagnosis , and its treatment have been considered controversial since the 1970s . The controversies have involved clinicians , teachers , policymakers , parents , and the media . Topics include ADHD 's causes and the use of stimulant medications in its treatment . Most healthcare providers accept ADHD as a genuine disorder , and the debate in the scientific community mainly centers on how it is diagnosed and treated . The condition was officially known as attention deficit disorder (ADD) from 1980 to 1987 while before this it was known as hyperkinetic reaction of childhood .

= = Signs and symptoms = =

Inattention , hyperactivity (restlessness in adults) , disruptive behavior , and impulsivity are common in ADHD . Academic difficulties are frequent as are problems with relationships . The symptoms can be difficult to define as it is hard to draw a line at where normal levels of inattention , hyperactivity , and impulsivity end and significant levels requiring interventions begin .

According to the DSM @-@ 5 , symptoms must be present for six months or more to a degree that is much greater than others of the same age and they must cause significant problems functioning in at least two settings (e.g. , social , school / work , or home) . The full criteria must have been met prior to age 12 in order to receive a diagnosis of ADHD .

ADHD is divided into three subtypes : predominantly inattentive , predominantly hyperactive @-@ impulsive , and combined type .

An individual with ADHD inattentive type has most or all of following symptoms , excluding situations where these symptoms are better explained by another psychiatric or medical condition :

Be easily distracted , miss details , forget things , and frequently switch from one activity to another
Have difficulty maintaining focus on one task

- Become bored with a task after only a few minutes , unless doing something enjoyable
- Have difficulty focusing attention on organizing and completing a task or learning something new
- Have trouble completing or turning in homework assignments , often losing things (e.g. , pencils , toys , assignments) needed to complete tasks or activities
- Not seem to listen when spoken to
- Daydream , become easily confused , and move slowly
- Have difficulty processing information as quickly and accurately as others
- Struggle to follow instructions
- Have trouble understanding minute details

An individual with ADHD hyperactive / impulsive type has most or all of the following symptoms , excluding situations where these symptoms are better explained by another psychiatric or medical condition :

- Fidget and squirm in their seats
- Talk nonstop
- Dash around , touching or playing with anything and everything in sight
- Have trouble sitting still during dinner , school , doing homework , and story time
- Be constantly in motion
- Have difficulty doing quiet tasks or activities
- Be very impatient
- Blurt out inappropriate comments , show their emotions without restraint , and act without regard for consequences
- Have difficulty waiting for things they want or waiting their turns in games
- Often interrupt conversations or others ' activities

Symptoms of hyperactivity tend to go away with age and turn into " inner restlessness " in teens and adults with ADHD .

People with ADHD are more likely to have problems with social skills , such as social interaction and forming and maintaining friendships . This is true for all subtypes . About half of children and adolescents with ADHD experience social rejection by their peers compared to 10 ? 15 % of non @-@ ADHD children and adolescents . People with attention deficits are prone to having difficulty processing verbal and nonverbal language which can negatively affect social interaction . They also may drift off during conversations , and miss social cues .

Difficulties managing anger are more common in children with ADHD as are poor handwriting and delays in speech , language and motor development . Although it causes significant impairment , particularly in modern society , many children with ADHD have a good attention span for tasks they find interesting .

= = = Associated disorders = = =

In children , ADHD occurs with other disorders about ? of the time . Some commonly associated conditions include :

Learning disabilities have been found to occur in about 20 ? 30 % of children with ADHD . Learning disabilities can include developmental speech and language disorders and academic skills disorders . ADHD , however , is not considered a learning disability , but it very frequently causes academic difficulties .

Tourette syndrome has been found to occur more commonly in the ADHD population .

Oppositional defiant disorder (ODD) and conduct disorder (CD) , which occur with ADHD in about 50 % and 20 % of cases respectively . They are characterized by antisocial behaviors such as stubbornness , aggression , frequent temper tantrums , deceitfulness , lying , and stealing . About half of those with hyperactivity and ODD or CD develop antisocial personality disorder in adulthood . Brain imaging supports that conduct disorder and ADHD are separate conditions .

Primary disorder of vigilance , which is characterized by poor attention and concentration , as well as difficulties staying awake . These children tend to fidget , yawn and stretch and appear to be hyperactive in order to remain alert and active .

Mood disorders (especially bipolar disorder and major depressive disorder) . Boys diagnosed with the combined ADHD subtype are more likely to have a mood disorder . Adults with ADHD sometimes also have bipolar disorder , which requires careful assessment to accurately diagnose and treat both conditions .

Anxiety disorders have been found to occur more commonly in the ADHD population .

Obsessive @-@ compulsive disorder (OCD) can co @-@ occur with ADHD and shares many of its characteristics .

Substance use disorders . Adolescents and adults with ADHD are at increased risk of substance abuse . This is most commonly seen with alcohol or cannabis . The reason for this may be an altered reward pathway in the brains of ADHD individuals . This makes the evaluation and treatment of ADHD more difficult , with serious substance misuse problems usually treated first due to their greater risks .

Restless legs syndrome has been found to be more common in those with ADHD and is often due to iron deficiency anaemia . However , restless legs can simply be a part of ADHD and requires careful assessment to differentiate between the two disorders .

Sleep disorders and ADHD commonly co @-@ exist . They can also occur as a side effect of medications used to treat ADHD . In children with ADHD , insomnia is the most common sleep disorder with behavioral therapy the preferred treatment . Problems with sleep initiation are common among individuals with ADHD but often they will be deep sleepers and have significant difficulty getting up in the morning . Melatonin is sometimes used in children who have sleep onset insomnia .

There is an association with persistent bed wetting , language delay , and developmental coordination disorder (DCD) . Language delays can include auditory processing disorders such as short @-@ term auditory memory weakness , difficulty following instructions , slow speed of processing spoken language , and difficulties listening in distracting environments .

= = Cause = =

The cause of most cases of ADHD is unknown ; however , it is believed to involve interactions between genetic and environmental factors . Certain cases are related to previous infection of or trauma to the brain .

= = = Genetics = = =

Twin studies indicate that the disorder is often inherited from one 's parents with genetics determining about 75 % of cases . Siblings of children with ADHD are three to four times more likely to develop the disorder than siblings of children without the disorder . Genetic factors are also believed to be involved in determining whether ADHD persists into adulthood .

Typically , a number of genes are involved , many of which directly affect dopamine neurotransmission . Those involved with dopamine include DAT , DRD4 , DRD5 , TAAR1 , MAOA , COMT , and DBH . Other genes associated with ADHD include SERT , HTR1B , SNAP25 , GRIN2A , ADRA2A , TPH2 , and BDNF . A common variant of a gene called LPHN3 is estimated to be responsible for about 9 % of cases and when this variant is present , people are particularly responsive to stimulant medication . The 7 repeat variant of dopamine receptor D4 (DRD4 ? 7R) causes increased inhibitory effects induced by dopamine and is associated with ADHD . The DRD4 receptor is a G protein @-@ coupled receptor that inhibits adenylyl cyclase . The DRD4 ? 7R mutation results in a wide range of behavioral phenotypes , including ADHD symptoms reflecting split attention .

Evolution may have played a role in the high rates of ADHD , particularly hyperactive and impulsive traits in males . Some have hypothesized that some women may be more attracted to males who are risk takers , increasing the frequency of genes that predispose to hyperactivity and impulsivity in the gene pool . Others have claimed that these traits may be an adaptation that helped males face stressful or dangerous environment with , for example , increased impulsivity and exploratory

behavior . In certain situations , ADHD traits may have been beneficial to society as a whole even while being harmful to the individual . The high rates and heterogeneity of ADHD may have increased reproductive fitness and benefited society by adding diversity to the gene pool despite being detrimental to the individual . In certain environments , some ADHD traits may have offered personal advantages to individuals , such as quicker response to predators or superior hunting skills .

People with Down syndrome are more likely to have ADHD .

== Environment ==

In addition to genetics , some environmental factors might play a role . Alcohol intake during pregnancy can cause fetal alcohol spectrum disorders which can include ADHD or symptoms like it . Children exposed to certain toxic substances , such as lead or polychlorinated biphenyls , may develop problems which resemble ADHD . Exposure to the organophosphate insecticides chlorpyrifos and dialkyl phosphate is associated with an increased risk ; however , the evidence is not conclusive . Exposure to tobacco smoke during pregnancy can cause problems with central nervous system development and can increase the risk of ADHD .

Extreme premature birth , very low birth weight , and extreme neglect , abuse , or social deprivation also increase the risk as do certain infections during pregnancy , at birth , and in early childhood . These infections include , among others , various viruses (measles , varicella zoster encephalitis , rubella , enterovirus 71) . At least 30 % of children with a traumatic brain injury later develop ADHD and about 5 % of cases are due to brain damage .

Some studies suggest that in a minority of children , artificial food dyes or preservative may be associated with an increased prevalence of ADHD or ADHD @-@ like symptoms but the evidence is weak and may only apply to children with food sensitivities . The United Kingdom and the European Union have put in place regulatory measures based on these concerns . In a minority of children , intolerances or allergies to certain foods may worsen ADHD symptoms .

Research does not support popular beliefs that ADHD is caused by eating too much refined sugar , watching too much television , parenting , poverty or family chaos ; however , they might worsen ADHD symptoms in certain people .

== Society ==

The diagnosis of ADHD can represent family dysfunction or a poor educational system rather than an individual problem . Some cases may be explained by increasing academic expectations , with a diagnosis being a method for parents in some countries to get extra financial and educational support for their child . The youngest children in a class have been found to be more likely to be diagnosed as having ADHD possibly due to their being developmentally behind their older classmates . Behaviors typical of ADHD occurs more commonly in children who have experienced violence and emotional abuse .

According to social construction theory it is societies that determine the boundary between normal and abnormal behavior . Members of society , including physicians , parents , and teachers , determine which diagnostic criteria are used and , thus , the number of people affected . This leads to the current situation where the DSM @-@ IV arrives at levels of ADHD three to four times higher than those obtained with the ICD @-@ 10 . Thomas Szasz , a supporter of this theory , has argued that ADHD was " invented and not discovered . "

== Pathophysiology ==

Current models of ADHD suggest that it is associated with functional impairments in some of the brain 's neurotransmitter systems , particularly those involving dopamine and norepinephrine . The dopamine and norepinephrine pathways that originate in the ventral tegmental area and locus coeruleus project to diverse regions of the brain and govern a variety of cognitive processes . The

dopamine pathways and norepinephrine pathways which project to the prefrontal cortex and striatum are directly responsible for modulating executive function (cognitive control of behavior) , motivation , reward perception , and motor function ; these pathways are known to play a central role in the pathophysiology of ADHD . Larger models of ADHD with additional pathways have been proposed .

== Brain structure ==

In children with ADHD , there is a general reduction of volume in certain brain structures , with a proportionally greater decrease in the volume in the left @-@ sided prefrontal cortex . The posterior parietal cortex also shows thinning in ADHD individuals compared to controls . Other brain structures in the prefrontal @-@ striatal @-@ cerebellar and prefrontal @-@ striatal @-@ thalamic circuits have also been found to differ between people with and without ADHD .

== Neurotransmitter pathways ==

Previously it was thought that the elevated number of dopamine transporters in people with ADHD was part of the pathophysiology but it appears that the elevated numbers are due to adaptation to exposure to stimulants . Current models involve the mesocorticolimbic dopamine pathway and the locus coeruleus @-@ noradrenergic system . ADHD psychostimulants possess treatment efficacy because they increase neurotransmitter activity in these systems . There may additionally be abnormalities in serotonergic and cholinergic pathways . Neurotransmission of glutamate , a cotransmitter with dopamine in the mesolimbic pathway , seems to be also involved .

== Executive function and motivation ==

The symptoms of ADHD arise from a deficiency in certain executive functions (e.g. , attentional control , inhibitory control , and working memory) . Executive functions are a set of cognitive processes that are required to successfully select and monitor behaviors that facilitate the attainment of one 's chosen goals . The executive function impairments that occur in ADHD individuals result in problems with staying organized , time keeping , excessive procrastination , maintaining concentration , paying attention , ignoring distractions , regulating emotions , and remembering details . People with ADHD appear to have unimpaired long @-@ term memory , and deficits in long @-@ term recall appear to be attributed to impairments in working memory . The criteria for an executive function deficit are met in 30 ? 50 % of children and adolescents with ADHD . One study found that 80 % of individuals with ADHD were impaired in at least one executive function task , compared to 50 % for individuals without ADHD . Due to the rates of brain maturation and the increasing demands for executive control as a person gets older , ADHD impairments may not fully manifest themselves until adolescence or even early adulthood .

ADHD has also been associated with motivational deficits in children . Children with ADHD find it difficult to focus on long @-@ term over short @-@ term rewards , and exhibit impulsive behavior for short @-@ term rewards . In these individuals , a large amount of positive reinforcement effectively improves task performance . ADHD stimulants may improve persistence in ADHD children as well .

== Intelligence ==

Overall , studies have shown that people with ADHD tend to have lower scores on intelligence quotient (IQ) tests . The significance of this is controversial due to the differences between people with ADHD and the difficulty determining the influence of symptoms , such as distractibility , on lower scores rather than intellectual capacity . In studies of ADHD , higher IQ ? s may be over represented because many studies exclude individuals who have lower IQ ? s despite those with ADHD scoring on average 9 points lower on standardized intelligence measures . As a result , we may have less of

an accurate understanding of ADHD .

= = Diagnosis = =

ADHD is diagnosed by an assessment of a person 's childhood behavioral and mental development , including ruling out the effects of drugs , medications and other medical or psychiatric problems as explanations for the symptoms . It often takes into account feedback from parents and teachers with most diagnoses begun after a teacher raises concerns . It may be viewed as the extreme end of one or more continuous human traits found in all people . Whether someone responds to medications does not confirm or rule out the diagnosis . As imaging studies of the brain do not give consistent results between individuals , they are only used for research purposes and not diagnosis .

In North America , DSM @-@ 5 criteria are used for diagnosis , while European countries usually use the ICD @-@ 10 . With the DSM @-@ IV criteria a diagnosis of ADHD is 3 ? 4 times more likely than with the ICD @-@ 10 criteria . It is classified as neurodevelopmental psychiatric disorder . Additionally , it is classified as a disruptive behavior disorder along with oppositional defiant disorder , conduct disorder , and antisocial personality disorder . A diagnosis does not imply a neurological disorder .

Associated conditions that should be screened for include anxiety , depression , oppositional defiant disorder , conduct disorder , and learning and language disorders . Other conditions that should be considered are other neurodevelopmental disorders , tics , and sleep apnea .

Diagnosis of ADHD using quantitative electroencephalography (QEEG) is an ongoing area of investigation , although the value of QEEG in ADHD is currently unclear . In the United States , the Food and Drug Administration has approved the use of QEEG to evaluate the morbidity of ADHD .

= = Diagnostic and Statistical Manual = = =

As with many other psychiatric disorders , formal diagnosis is made by a qualified professional based on a set number of criteria . In the United States , these criteria are defined by the American Psychiatric Association in the DSM . Based on the DSM criteria , there are three sub @-@ types of ADHD :

ADHD predominantly inattentive type (ADHD @-@ PI) presents with symptoms including being easily distracted , forgetful , daydreaming , disorganization , poor concentration , and difficulty completing tasks .

ADHD , predominantly hyperactive @-@ impulsive type presents with excessive fidgetiness and restlessness , hyperactivity , difficulty waiting and remaining seated , immature behavior ; destructive behaviors may also be present .

ADHD , combined type is a combination of the first two subtypes .

This subdivision is based on presence of at least six out of nine long @-@ term (lasting at least six months) symptoms of inattention , hyperactivity ? impulsivity , or both . To be considered , the symptoms must have appeared by the age of six to twelve and occur in more than one environment (e.g. at home and at school or work) . The symptoms must be not appropriate for a child of that age and there must be evidence that it is causing social , school or work related problems .

= = = International Classification of Diseases = = =

In the ICD @-@ 10 , the symptoms of " hyperkinetic disorder " are analogous to ADHD in the DSM @-@ 5 . When a conduct disorder (as defined by ICD @-@ 10) is present , the condition is referred to as hyperkinetic conduct disorder . Otherwise , the disorder is classified as disturbance of activity and attention , other hyperkinetic disorders or hyperkinetic disorders , unspecified . The latter is sometimes referred to as hyperkinetic syndrome .

= = = Adults = = =

Adults with ADHD are diagnosed under the same criteria , including that their signs must have been present by the age of six to twelve . Questioning parents or guardians as to how the person behaved and developed as a child may form part of the assessment ; a family history of ADHD also adds weight to a diagnosis . While the core symptoms of ADHD are similar in children and adults they often present differently in adults than in children , for example excessive physical activity seen in children may present as feelings of restlessness and constant mental activity in adults .

= = = Differential diagnosis = = =

Symptoms of ADHD such as low mood and poor self @-@ image , mood swings , and irritability can be confused with dysthymia , cyclothymia or bipolar disorder as well as with borderline personality disorder . Some symptoms that are due to anxiety disorders , antisocial personality disorder , developmental disabilities or mental retardation or the effects of substance abuse such as intoxication and withdrawal can overlap with some ADHD . These disorders can also sometimes occur along with ADHD . Medical conditions which can cause ADHD type symptoms include : hyperthyroidism , seizure disorder , lead toxicity , hearing deficits , hepatic disease , sleep apnea , drug interactions , untreated celiac disease , and head injury .

Primary sleep disorders may affect attention and behavior and the symptoms of ADHD may affect sleep . It is thus recommended that children with ADHD be regularly assessed for sleep problems . Sleepiness in children may result in symptoms ranging from the classic ones of yawning and rubbing the eyes , to hyperactivity and inattentiveness . Obstructive sleep apnea can also cause ADHD type symptoms .

= = Management = =

The management of ADHD typically involves counseling or medications either alone or in combination . While treatment may improve long @-@ term outcomes , it does not get rid of negative outcomes entirely . Medications used include stimulants , atomoxetine , alpha @-@ 2 adrenergic receptor agonists , and sometimes antidepressants .

= = = Behavioral therapies = = =

There is good evidence for the use of behavioral therapies in ADHD and they are the recommended first line treatment in those who have mild symptoms or are preschool @-@ aged . Psychological therapies used include : psychoeducational input , behavior therapy , cognitive behavioral therapy (CBT) , interpersonal psychotherapy , family therapy , school @-@ based interventions , social skills training , behavioral peer intervention , organization training , parent management training , and neurofeedback . Behavior modification and neurofeedback have the best support .

Parent training and education have been found to have short @-@ term benefits . There is little high quality research on the effectiveness of family therapy for ADHD , but the evidence that exists shows that it is similar to community care and better than a placebo . Several ADHD specific support groups exist as informational sources and may help families cope with ADHD .

Training in social skills , behavioral modification and medication may have some limited beneficial effects . The most important factor in reducing later psychological problems , such as major depression , criminality , school failure , and substance use disorders is formation of friendships with people who are not involved in delinquent activities .

Regular physical exercise , particularly aerobic exercise , is an effective add @-@ on treatment for ADHD in children and adults , particularly when combined with stimulant medication , although the best intensity and type of aerobic exercise for improving symptoms are not currently known . In particular , the long @-@ term effects of regular aerobic exercise in ADHD individuals include better behavior and motor abilities , improved executive functions (including attention , inhibitory control , planning , and cognitive processing speed , among other cognitive domains) , and better memory

without causing any side effects . Exercising while on stimulant medication augments the effect of stimulant medication on executive function . It is believed that these short @-@ term effects of exercise are mediated by an increased abundance of synaptic dopamine and norepinephrine in the brain .

== Medication ==

Stimulant medications are the pharmaceutical treatment of choice . They have at least some effect in the short term in about 80 % of people . Methylphenidate appears to improve symptoms as reported by teachers and parents .

There are a number of non @-@ stimulant medications , such as atomoxetine , bupropion , guanfacine , and clonidine that may be used as alternatives , or added to stimulant therapy . There are no good studies comparing the various medications ; however , they appear more or less equal with respect to side effects . Stimulants appear to improve academic performance while atomoxetine does not . There is little evidence on their effects on social behaviors . Medications are not recommended for preschool children , as the long @-@ term effects in this age group are not known . The long @-@ term effects of stimulants generally are unclear with one study finding benefit , another finding no benefit and a third finding evidence of harm . Magnetic resonance imaging studies suggest that long @-@ term treatment with amphetamine or methylphenidate decreases abnormalities in brain structure and function found in subjects with ADHD . Atomoxetine , due to its lack of addiction liability , may be preferred in those who are at risk of recreational or compulsive stimulant use . Guidelines on when to use medications vary by country , with the United Kingdom 's National Institute for Health and Care Excellence recommending use only in severe cases , Switzerland strongly limits the authorised medications , while most United States guidelines recommend medications in most age groups .

Underdosing of stimulants may occur and result in a lack of response or later loss of effectiveness . This is particularly common in adolescents and adults as approved dosing is based on school @-@ aged children , causing some practitioners to use weight based or benefit based off @-@ label dosing instead .

While stimulants and atomoxetine are usually safe , there are side @-@ effects and contraindications to their use . A large overdose on ADHD stimulants is commonly associated with symptoms such as stimulant psychosis and mania ; although very rare , at therapeutic doses these events appear to occur in approximately 0 @.@ 1 % of individuals within the first several weeks after starting amphetamine or methylphenidate therapy . Administration of an antipsychotic medication has been found to effectively resolve the symptoms of acute amphetamine psychosis . Regular monitoring has been recommended in those on long @-@ term treatment . Stimulant therapy should be stopped periodically to assess for continuing need for medication , decrease possible growth delay , and reduce tolerance . Long @-@ term misuse of stimulant medications at doses above the therapeutic range for ADHD treatment is associated with addiction and dependence . Untreated ADHD , however , is also associated with elevated risk of substance use disorders and conduct disorders . The use of stimulants appears to either reduce this risk or have no effect on it . The safety of these medications in pregnancy is unclear .

== Diet ==

Dietary modifications may be of benefit to some children with ADHD . A 2013 meta @-@ analysis found less than a third of children with ADHD see some improvement in symptoms with free fatty acid supplementation or decreased eating of artificial food coloring . These benefits may be limited to children with food sensitivities or those who are simultaneously being treated with ADHD medications . This review also found that evidence does not support removing other foods from the diet to treat ADHD . A 2014 review found that an elimination diet results in a small overall benefit . A 2016 review did not support a clear link between celiac disease and ADHD , and stated that routine screening for celiac disease in people with ADHD and the use of a gluten @-@ free diet as standard

ADHD treatment are discouraged . Iron , magnesium and iodine may also have an effect on ADHD symptoms . There is a small amount of evidence that lower tissue zinc levels may be associated with ADHD . In the absence of a demonstrated zinc deficiency (which is rare outside of developing countries) , zinc supplementation is not recommended as treatment for ADHD . There is evidence of a modest benefit of omega 3 fatty acid supplementation , but it is not recommended in place of traditional medication .

= = Prognosis = =

An 8 @-@ year follow up of children diagnosed with ADHD (combined type) found that they often have difficulties in adolescence , regardless of treatment or lack thereof . In the US , fewer than 5 % of individuals with ADHD get a college degree , compared to 28 % of the general population aged 25 years and older . The proportion of children meeting criteria for ADHD drops by about half in the three years following the diagnosis and this occurs regardless of treatments used . ADHD persists into adulthood in about 30 ? 50 % of cases . Those affected are likely to develop coping mechanisms as they mature , thus compensating for their previous symptoms .

= = Epidemiology = =

ADHD is estimated to affect about 6 ? 7 % of people aged 18 and under when diagnosed via the DSM @-@ IV criteria . When diagnosed via the ICD @-@ 10 criteria rates in this age group are estimated at 1 ? 2 % . Children in North America appear to have a higher rate of ADHD than children in Africa and the Middle East ; this is believed to be due to differing methods of diagnosis rather than a difference in underlying frequency . If the same diagnostic methods are used , the rates are more or less the same between countries . It is diagnosed approximately three times more often in boys than in girls . This difference between sexes may reflect either a difference in susceptibility or that females with ADHD are less likely to be diagnosed than males .

Rates of diagnosis and treatment have increased in both the United Kingdom and the United States since the 1970s . This is believed to be primarily due to changes in how the condition is diagnosed and how readily people are willing to treat it with medications rather than a true change in how common the condition is . It is believed that changes to the diagnostic criteria in 2013 with the release of the DSM @-@ 5 will increase the percentage of people diagnosed with ADHD , especially among adults .

= = History = =

Hyperactivity has long been part of the human condition . Sir Alexander Crichton describes " mental restlessness " in his book An inquiry into the nature and origin of mental derangement written in 1798 . ADHD was first clearly described by George Still in 1902 .

The terminology used to describe the condition has changed over time and has included : in the DSM @-@ I (1952) " minimal brain dysfunction " , in the DSM @-@ II (1968) " hyperkinetic reaction of childhood " , in the DSM @-@ III (1980) " attention @-@ deficit disorder (ADD) with or without hyperactivity " . In 1987 this was changed to ADHD in the DSM @-@ III @-@ R and the DSM @-@ IV in 1994 split the diagnosis into three subtypes , ADHD inattentive type , ADHD hyperactive @-@ impulsive type and ADHD combined type . These terms were kept in the DSM @-@ 5 in 2013 . Other terms have included " minimal brain damage " used in the 1930s .

The use of stimulants to treat ADHD was first described in 1937 . In 1934 , Benzedrine became the first amphetamine medication approved for use in the United States . Methylphenidate was introduced in the 1950s , and enantiopure dextroamphetamine in the 1970s .

= = Society and culture = =

== Controversies ==

ADHD , its diagnosis , and its treatment have been controversial since the 1970s . The controversies involve clinicians , teachers , policymakers , parents , and the media . Positions range from the view that ADHD is within the normal range of behavior to the hypothesis that ADHD is a genetic condition . Other areas of controversy include the use of stimulant medications in children , the method of diagnosis , and the possibility of overdiagnosis . In 2012 , the National Institute for Health and Care Excellence , while acknowledging the controversy , states that the current treatments and methods of diagnosis are based on the dominant view of the academic literature . In 2014 , Keith Conners , one of the early advocates for recognition of the disorder , spoke out against overdiagnosis in a New York Times article . In contrast , a 2014 peer @-@ reviewed medical literature review indicated that ADHD is underdiagnosed in adults .

With widely differing rates of diagnosis across countries , states within countries , races , and ethnicities , some suspect factors other than the presence of the symptoms of ADHD are playing a role in diagnosis . Some sociologists consider ADHD to be an example of the medicalization of deviant behavior , that is , the turning of the previously non @-@ medical issue of school performance into a medical one . Most healthcare providers accept ADHD as a genuine disorder , at least in the small number of people with severe symptoms . Among healthcare providers the debate mainly centers on diagnosis and treatment in the much larger number of people with less severe symptoms .

As of 2009 , 8 % of all United States Major League Baseball players had been diagnosed with ADHD , making the disorder common among this population . The increase coincided with the League 's 2006 ban on stimulants , which has raised concern that some players are mimicking or falsifying the symptoms or history of ADHD to get around the ban on the use of stimulants in sport .

== Media commentary ==

A number of public figures have given controversial statements regarding ADHD . Tom Cruise has described the medications Ritalin (methylphenidate) and Adderall (a mixed @-@ salt amphetamine formulation) as " street drugs " . Ushma S. Neill criticized this view , stating that the doses of stimulants used in the treatment of ADHD do not cause addiction and that there is some evidence of a reduced risk of later substance addiction in children treated with stimulants . In the UK , Susan Greenfield spoke out publicly in 2007 in the House of Lords about the need for a wide @-@ ranging inquiry into the dramatic increase in the diagnosis of ADHD , and possible causes . Her comments followed a BBC Panorama program that highlighted research that suggested medications are no better than other forms of therapy in the long term . In 2010 , the BBC Trust criticized the 2007 Panorama program for summarizing the research as showing " no demonstrable improvement in children 's behaviour after staying on ADHD medication for three years " when in actuality " the study found that medication did offer a significant improvement over time " although the long @-@ term benefits of medication were found to be " no better than children who were treated with behavior therapy . "

== Special populations ==

== Adults ==

It is estimated that between 2 ? 5 % of adults have ADHD . Around 25 @-@ 50 % of children with ADHD continue to experience ADHD symptoms into adulthood , while the rest experiences fewer or no symptoms . Most adults remain untreated . Many have a disorganized life and use non @-@ prescribed drugs or alcohol as a coping mechanism . Other problems may include relationship and job difficulties , and an increased risk of criminal activities . Associated mental health problems include : depression , anxiety disorder , and learning disabilities .

Some ADHD symptoms in adults differ from those seen in children . While children with ADHD may climb and run about excessively , adults may experience an inability to relax , or they talk excessively in social situations . Adults with ADHD may start relationships impulsively , display sensation @-@ seeking behavior , and be short @-@ tempered . Addictive behavior such as substance abuse and gambling are common . The DSM @-@ IV criteria have been criticized for not being appropriate for adults ; those who present differently may lead to the claim that they outgrew the diagnosis .