

Fact Sheet: Attention Deficit Hyperactivity Disorder (ADHD) Topics

MAJOR CHARACTERISTICS

OTHER CHARACTERISTICS

ADULT OUTCOME

SUBTYPES

PREVALENCE

ETIOLOGIES

TREATMENT

MORE INFORMATION - SUGGESTED READINGS

MORE INFORMATION - SUGGESTED READINGS FOR TEACHERS

Attention-deficit hyperactivity disorder (ADHD) is the current term for a specific developmental disorder seen in both children and adults that is comprised of deficits in behavioral inhibition, sustained attention and resistance to distraction, and the regulation of one's activity level to the demands of a situation (hyperactivity or restlessness). This disorder has had numerous different labels over the past century, including hyperactive child syndrome, hyperkinetic reaction of childhood, minimal brain dysfunction, and attention deficit disorder (with or without hyperactivity).

MAJOR CHARACTERISTICS

The predominant features of this disorder include:

1. Impaired response inhibition, impulse control, or the capacity to delay gratification. This is often noted in the individual's inability to stop and think before acting; to wait one's turn while playing games, conversing with others, or having to wait in line; to interrupt their responding quickly when it becomes evident that their actions are no longer effective; to resist distractions while concentrating or working; to work for larger, longer-term rewards rather than opting for smaller, more immediate ones; and inhibiting the dominant or immediate reaction to an event, as the situation may demand.
2. Excessive task-irrelevant activity or activity that is poorly regulated to the demands of a situation. Individuals with ADHD in many cases are noted to be excessively fidgety, restless, and "on the go." They display excessive movement not required to complete a task, such as wriggling their feet and legs, tapping things, rocking while seated, or shifting their posture or position while performing relatively boring tasks. Younger children with the disorder may show excessive running, climbing, and other gross motor activity. While this tends to decline with age, even teenagers with ADHD are more restless and fidgety than their peers. In adults with the disorder, this restlessness may be more subjective than outwardly observable, although with some adults they remain outwardly restless as well and report a need to always be busy or doing something and being unable to sit still.
3. Poor sustained attention or persistence of effort to tasks. This problem often arises when the individual is assigned boring, tedious, protracted, or repetitive activities that lack intrinsic appeal to the person. They often fail to show the same level of persistence, "stick-to-it-iveness," motivation, and will-power of others their age when uninteresting yet important tasks must be performed. They often report becoming easily bored with such tasks and consequently shift from one uncompleted activity to another without completing these activities. Loss of concentration during tedious, boring, or protracted tasks is commonplace, as is an inability to return to their task on which they were working should they be unexpectedly interrupted. Thus, they are easily distracted during periods when concentration is important to the task at hand. They may also have problems with completing routine assignments without direct supervision, being unable to stay on task during independent work.

These are the three most common areas of difficulty associated with ADHD. However, research is suggesting that those with ADHD, particularly the subtypes associated with impulsive behavior (see below), may also have difficulties in the following areas of psychological functioning as well:

1. Remembering to do things, or working memory. Working memory refers to the capacity to hold information in mind that will be used to guide one's actions, either now, or at a later time. It is essential for remembering to do things in the near future. Those with ADHD often have difficulties with working memory and so are described as forgetful around doing things, unable to keep important information in mind that they will need to guide their actions later, and disorganized in their thinking and other activities as they often lose track of the goal of their activities. They may often be described as acting without hindsight or forethought, and being less able to anticipate and prepare for future events as well as others, all of which seem to be dependent on working memory. Recently, research suggests that those with ADHD cannot sense or use time as adequately as others in their daily activities, such that they are often

late for appointments and deadlines, ill-prepared for upcoming activities, and less able to pursue long-term goals and plans as well as others. Problems with time management and organizing themselves for upcoming events are commonplace in older children and adults with the disorder.

2. Delayed development of internal language (the mind's voice) and rule-following. Research has lately been suggesting that children with ADHD are significantly delayed in the development of internal language, the private voice inside one's mind that we employ to converse with ourselves, contemplate events, and direct or command our own behavior. This private speech is absolutely essential to the normal development of contemplation, reflection, and self-regulation. Its delay in those with ADHD contributes to significant problems with their ability to follow through on rules and instructions, to read and follow directions carefully, to follow through on their own plans, rules, and "do-lists," and even to act with legal or moral principles in mind. When combined with their difficulties with working memory, this problem with self-talk or private speech often results in significant interference with reading comprehension, especially of complex, uninteresting, or extended reading assignments.

3. Difficulties with regulation of emotions, motivation, and arousal. Children and adults with ADHD often have problems inhibiting their emotional reactions to events as well as do others of their age. It is not that the emotions they experience are inappropriate, but that those with ADHD are more likely to publicly manifest the emotions they experience than would someone else. They seem less able to "internalize" their feelings, to keep them to themselves, and even to moderate them when they do so as others might do. Consequently, they are likely to appear to others as less emotionally mature, more reactive with their feelings, and more hot-headed, quick-tempered, and easily frustrated by events. Coupled with this problem with emotion regulation is the difficulty they have in generating intrinsic motivation for tasks that have no immediate payoff or appeal to them. This capacity to create private motivation, drive, or determination often makes them appear to lack will-power or self-discipline as they cannot stay with things that do not provide immediate reward, stimulation, or interest to them. Their motivation remains dependent on the immediate environment for how hard and how long they will work, whereas others develop a capacity for intrinsically motivating themselves in the absence of immediate rewards or other consequences. Also related to these difficulties with regulating emotion and motivation is that of regulating their general level of arousal to meet situational demands. Those with ADHD find it difficult to activate or arouse themselves to initiate work that must be done, often complain of being unable to stay alert or even awake in boring situations, and frequently seem to be daydreamy or "in a fog" when they should be more alert, focused, and actively engaged in a task.

4. Diminished problem-solving ability, ingenuity, and flexibility in pursuing long-term goals. Often times, when we are engaged in goal-directed activities, problems are encountered that are obstacles to the goal's attainment. At these times, individuals must be capable of quickly generating a variety of options to themselves, considering their respective outcomes, and selecting among them those which seem most likely to surmount the obstacle so they can continue toward their goal. Persons with ADHD find such hurdles to their goals to be more difficult to surmount; often giving up their goals in the face of obstacles and not taking the time to think through other options that could help them succeed toward their goal. Thus they may appear as less flexible in approaching problem situations, more likely to respond automatically or on impulse, and so are less creative at overcoming the road-blocks to their goals than others are likely to be. These problems may even be evident in the speech and writing of those with the disorder, as they are less able to quickly assemble their ideas into a more organized, coherent explanation of their thoughts. And so they are less able to rapidly assemble their actions or ideas into a chain of responses that effectively accomplishes the goal given them, be it verbal or behavioral in nature.

5. Greater than normal variability in their task or work performance. It is typical of those with ADHD, especially those subtypes associated with impulsive behavior, to show substantial variability across time in the performance of their work. These wide swings may be found in the quality, quantity, and even speed of their work, failing to maintain a relatively even pattern of productivity and accuracy in their work from moment to moment and day to day. Such variability is often puzzling to others who witness it as it is clear that at some times, the person with ADHD can complete their work quickly and correctly while at others times, their tasks are performed poorly, inaccurately, and quite erratically. Indeed, some researchers see this pattern of high variability in work-related activities to be as much a hallmark of the disorder as is the poor inhibition and inattention described above.

OTHER CHARACTERISTICS

Several other development characteristics are associated with the disorder:

1. Early onset of the major characteristics. The symptoms of ADHD appear to arise, on average, between 3 and 6 years of age. This is particularly so for those subtypes of ADHD associated with hyperactive and impulsive behavior. Others may not develop their symptoms until somewhat later in childhood. But certainly the vast majority of those with the disorder have had some symptoms since before the age of 13 years. Those who have the Predominantly

Inattentive Type of ADHD that is not associated with impulsiveness appear to develop their attention problems somewhat later than do the other subtypes, often in middle or later childhood. And so the disorder is believed to be one of childhood onset, regardless of the subtype, suggesting that should these symptoms develop for the first time in adulthood, other mental disorders rather than ADHD should be suspected.

2. Situational variation of symptoms. The major symptoms of ADHD are likely to change markedly as a consequence of the nature of the situation the person happens to be in. Research suggests that those with ADHD behave better in one-to-one situations, when doing tasks that they enjoy or find interesting, when there is some immediate payoff for behaving well, when they are supervised, in their work done earlier in the day rather than later, and, for children, when they are with their fathers compared to their mothers. Conversely, those with ADHD may manifest more of their symptoms in group settings, when they must perform boring work, when they must work independently of supervision, when their work must be done later in the day, and when they are with their mothers. Sometimes or in some cases, these situational factors may have little effect on the person's level of ADHD symptoms but they have been noted often enough in research to make such situational changes in their symptoms important to appreciate.

3. Relatively chronic course. ADHD symptoms are often quite developmentally stable. Although the absolute level of symptoms does decline with age, this is true of the inattentiveness, impulsiveness, and activity levels of normal individuals as well. And so those with ADHD may be improving in their behavior but not always catching up with their peer group in this regard. This seems to leave them chronically behind others of their age in their capacity to inhibit behavior, sustain attention, control distractibility, and regulate their activity level. Research suggests that among those children clinically diagnosed with the disorder in childhood, 50-80 percent will continue to meet the criteria for the diagnosis in adolescence, and 10-65 percent may continue to do so in adulthood. Whether or not they have the full syndrome in adulthood, at least 50-70 percent may continue to manifest some symptoms that are causing them some impairment in their adult life.

ADULT OUTCOME

It has been estimated that anywhere from 15 to 50 percent of those with ADHD ultimately outgrow the disorder. However, these figures come from follow-up studies in which the current and more rigorous diagnostic criteria for the disorder were not used. When more appropriate and modern criteria are employed, probably only 20-35 percent of children with the disorder no longer have any symptoms resulting in impairment in their adult life. Over the course of their lives, a significant minority of those with ADHD experience a greater risk for developing oppositional and defiant behavior (50%+), conduct problems and antisocial difficulties (25-45%), learning disabilities (25-40%), low self-esteem, and depression (25%). Approximately 5-10 percent of those with ADHD may develop more serious mental disorders, such as manic-depression or bipolar disorder. Between 10 and 20 percent may develop antisocial personality disorder by adulthood, most of whom will also have problems with substance abuse. Overall, approximately 10-25 percent develop difficulties with over-use, dependence upon, or even abuse of legal (i.e., alcohol, tobacco) or illegal substances (i.e., marijuana, cocaine, illicit use of prescription drugs, etc.), with this risk being greatest among those who had conduct disorder or delinquency as adolescents. Despite these risks, note should certainly be taken that upwards of half or more of those having ADHD do not develop these associated difficulties or disorders. However, the majority of those with ADHD certainly experienced problems with school performance, with as many as 30-50 percent having been retained in their school grade at least once, and 25-36 percent never completing high school.

As adults, those with ADHD are likely to be under-educated relative to their intellectual ability and family educational background. They are also likely to experience difficulties with work adjustment, and may be under-employed in their occupations relative to their intelligence, and educational and family backgrounds. They tend to change their jobs more often than others do, sometimes out of boredom or because of interpersonal problems in the workplace. They also tend to have a greater turnover of friendships and dating relationships and seem more prone to marital discord and even divorce. Difficulties with speeding while driving are relatively commonplace, as are more traffic citations for this behavior, and, in some cases, more motor vehicle accidents than others are likely to experience in their driving careers. Thus, they are more likely to have had their driver's license suspended or revoked.

SUBTYPES

Since 1980, it has become possible to place those with ADHD into several subtypes, depending upon the combinations of symptoms they experience. Those who have difficulties primarily with impulsive and hyperactive behavior and not with attention or concentration are now referred to as having the Predominantly Hyperactive-Impulsive Type. Individuals with the opposite pattern, significant inattentiveness without being impulsive or hyperactive are called the Predominantly Inattentive Type. However, most individuals with the disorder will manifest

both of these clinical features and so are referred to as the Combined Type of ADHD. Research on those with the Combined Type suggests that they are likely to develop their hyperactive and/or impulsive symptoms first and usually during the preschool years. At this age, then, they may be diagnosed as having the Predominantly Hyperactive-Impulsive Type. However, in most of these cases, they will eventually progress to developing the difficulties with attention span, persistence, and distractibility within a few years of entering school such that they will now be diagnosed as having the Combined Type.

There is considerably less research on the Predominantly Inattentive Type of ADHD, or what used to be referred to as attention deficit disorder without hyperactivity. What research does exist suggests some qualitative differences between the attention problems these individuals experience and those with the other types of ADHD in which hyperactive or impulsive behavior is present. The Predominantly Inattentive Type of ADHD appears to be associated with more daydreaming, passiveness, sluggishness, difficulties with focused or selective attention (filtering important from unimportant information), slow processing of information, mental foginess and confusion, social quietness or apprehensiveness, hypo-activity, and inconsistent retrieval of information from memory. It is also considerably less likely to be associated with impulsiveness (by definition) as well as oppositional/defiant behavior, conduct problems, or delinquency. Should further research continue to demonstrate such differences, there would be good reason to view this subtype as actually a separate and distinct disorder from that of ADHD.

PREVALENCE

ADHD occurs in approximately 3-7 percent of the childhood population and approximately 2-5 percent of the adult population. Among children the gender ratio is approximately 3:1 with boys more likely to have the disorder than girls. Among adults, the gender ratio falls to 2:1 or lower. The disorder has been found to exist in virtually every country in which it has been investigated, including North America, South America, Great Britain, Scandinavia, Europe, Japan, China, Turkey and the middle East. The disorder may not be referred to as ADHD in these countries and may not be treated in the same fashion as in North America but there is little doubt that the disorder is virtually universal among human populations. The disorder is more likely to be found in families in which others have the disorder or where depression is more common. It is also more likely to occur in those with conduct problems and delinquency, tic disorders or Tourette's Syndrome, learning disabilities, or those with a history of prenatal alcohol or tobacco-smoke exposure, premature delivery or significantly low birth weight, or significant trauma to the frontal regions of the brain.

ETIOLOGIES

ADHD has very strong biological contributions to its occurrence. While precise causes have not yet been identified, there is little question that heredity/genetics makes the largest contribution to the expression of the disorder in the population. The heritability of ADHD averages approximately 80 percent, meaning that genetic factors account for 80 percent of the differences among individuals in this set of behavioral traits. For comparison, consider that this figure rivals that for the role of genetics in human height. Several genes associated with the disorder have been identified and undoubtedly more will be so given that ADHD represents a set of complex behavioral traits and so a single gene is unlikely to account for the disorder. In instances where heredity does not seem to be a factor, difficulties during pregnancy, prenatal exposure to alcohol and tobacco smoke, prematurity of delivery and significantly low birth weight, excessively high body lead levels, as well as post-natal injury to the prefrontal regions of the brain have all been found to contribute to the risk for the disorder in varying degrees. Research has not supported popularly held views that ADHD arises from excessive sugar intake, food additives, excessive viewing of television, or poor child management by parents. Some drugs used to treat seizure disorders in children may increase symptoms of ADHD in those children as side effects of these drugs but these effects are reversible.

TREATMENT

No treatments have been found to cure this disorder, but many treatments exist which can effectively assist with its management. Chief among these treatments is the education of the family and school staff about the nature of the disorder and its management, in the case of children with the disorder, and the education and counseling of the adult with ADHD and their family members. But among the treatments that results in the greatest degree of improvement in the symptoms of the disorder, research overwhelmingly supports the use of the stimulant medications for this disorder (e.g., methylphenidate or Ritalin, d-amphetamine or Dexedrine, Adderall, and, in rare cases, pemoline or Cylert). Evidence also shows that the tricyclic antidepressants, in particular desipramine, may also be effective in managing symptoms of the disorder as well as co-existing symptoms of mood disorder or anxiety. However, these antidepressants do not appear to be as effective as the stimulants. Research evidence is rather mixed on whether or not clonidine is of specific benefit for management of these symptoms apart from its well-known sedation effects. A

small percentage of individuals with ADHD may require combinations of these medications, or others, for the management of their disorder, often because of the co-existence of other mental disorders with their ADHD.

Psychological treatments, such as behavior modification in the classroom and parent training in child behavior management methods, have been shown to produce short-term benefits in these settings. However, the improvements which they render are often limited to those settings in which treatment is occurring and do not generalize to other settings that are not included in the management program. Moreover, recent studies suggest, as with the medications discussed above, that the gains obtained during treatment may not last once treatment has been terminated. Thus, it appears that treatments for ADHD must often be combined and must be maintained over long periods of time so as to sustain the initial treatment effects. In this regard, ADHD should be viewed like and other chronic medical condition that requires ongoing treatment for its effective management but whose treatments do not rid the individual of the disorder. Some children with ADHD may benefit from social skills training provided it is incorporated into their school program. Children with ADHD are now eligible for special educational services in the public schools under both the Individuals with Disabilities in Education Act (IDEA) and Section 504 of the Civil Rights Act.

Adults with ADHD are also eligible for accommodations in their workplace or educational settings under the Americans with Disabilities Act provided that the severity of their ADHD is such that it produces impairments in one or more major areas of life functioning and that they disclose their disorder to their employer or educational institution. Adults with the disorder may also require counseling about their condition, vocational assessment and counseling to find the most suitable work environment, time management and organizational assistance, and other suggestions for coping with their disorder. The medications noted above that are useful for children with ADHD have recently proven to be as effective in the management of ADHD in adults.

Treatments with little or no evidence for their effectiveness include dietary management, such as removal of sugar from the diet, high doses of vitamins, minerals, trace elements, or other popular health food remedies, long-term psychotherapy or psychoanalysis, biofeedback, play therapy, chiropractic treatment, or sensory-integration training, despite the widespread popularity of some of these treatment approaches.

The treatment of ADHD requires a comprehensive behavioral, psychological, educational, and sometimes medical evaluation followed by education of the individual or their family members as to the nature of the disorder and the methods proven to assist with its management. Treatment is likely to be multidisciplinary, requiring the assistance of the mental health, educational, and medical professions at various points in its course. Treatment must be provided over long time periods to assist those with ADHD in the ongoing management of their disorder. In so doing, many with the disorder can lead satisfactory, reasonably adjusted, and productive lives.

Adapted from R. A. Barkley & K. R. Murphy (2006) Attention deficit hyperactivity disorder: A clinical workbook (3rd ed.). New York: Guilford Publications. Copyright 2006 by Guilford Publications. Reprinted with permission. This clinical workbook has numerous forms, interviews, and rating scales that can be helpful to clinicians in their clinical practice. To order, go to our Products page in the Directory.

SUGGESTED READINGS

ADHD Report, a bimonthly newsletter for clinicians edited by Dr. Barkley with contributions from leading clinicians and researchers. Call Guilford Publications at 800-365-7006 to subscribe or go to www.guilford.com.

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Gordon, M. Dr. Gordon has four paperback books available for use with children with ADHD, and their parents, teachers, and siblings. He also has a new videotape for use in teaching children about ADHD. For information on these and other products, contact GSI Publications, www.gsi-add.com P. O. Box 746, DeWitt, NY 13214. (315-446-4849, or via e-mail at ADDGSI@aol.com). Dr. Gordon also markets **The Attention Training System**.

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