

# ATTENTION DEFICIT HYPERACTIVITY DISORDER

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## INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a childhood-onset psychiatric disorder whose cardinal symptoms are inattention, hyperactivity and impulsivity<sup>1</sup>. Diagnostic criteria for ADHD are based on extensive empirical research and appropriately lead to the diagnosis of a syndrome with higher interrater reliability, high predictability of course and medication responsiveness. The criteria of what constitutes children have broadened and there is growing appreciation of the persistence of ADHD into adulthood<sup>2</sup>.

**Diagnostic Features:** ADHD often referred to erroneously as ADD is presented in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) (American Psychological Association [APA], 1994, pp. 78-85) as a disorder usually first diagnosed in infancy, childhood or adolescence. The diagnostic criteria are enumerated as follows; either (1) or (2):

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

### Inattention

- a. Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
  - b. Often has difficulty in sustaining attention in tasks or playing activities
  - c. Often does not seem to listen when spoken to directly
  - d. Often does not follow through on instructions and fails to finish schoolwork, chores or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
  - e. Often has difficulty in organizing tasks and activities
  - f. Often avoids, dislikes or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
  - g. Often loses things necessary for tasks or activities (e.g. toys, school assignments, pencils, books or tools)
  - h. Is often easily distracted by extraneous stimuli
  - i. Is often forgetful in daily activities
2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

### Hyperactivity

- a. Often fidgets with hands or feet or squirms in seat
- b. Often leaves seat in classroom or in other situations in which remaining seated is expected
- c. Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
- d. Often has difficulty in playing or engaging in leisure activities quietly
- e. Is often "on the go" or often acts as if "driven by a motor"
- f. Often talks excessively

### Impulsivity

- a. Often blurts out answers before questions have been completed
- b. Often has difficulty in awaiting turn
- c. Often interrupts or intrudes on others (e.g. butts into conversations or games)
- d. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years
- e. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home)
- f. There must be clear evidence of clinically significant impairment in social, academic or occupational functioning
- g. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder or a Personality Disorder)

The DSM-IV also defines four diagnostic categories of ADHD based upon the impairments present. If Criteria A1 and A2 are met (inattention and hyperactivity-impulsivity), ADHD Combined Type is appropriate. If Criteria A1 is met (inattention), ADHD Predominately Inattentive Type is appropriate. And if Criteria A2 is met (hyperactivity-impulsivity), ADHD Predominately Hyperactive-Impulsive Type is appropriate. The fourth category is defined as ADHD Not Otherwise Specified (NOS) and is utilized for those who have "disorders with prominent symptoms of inattention or hyperactivity-impulsivity that do not meet the criteria for Attention Deficit/Hyperactivity

Disorder." The diagnosis of "In Partial Remission" can also be appended if a previous diagnosis has been made, but the individual no longer meets the full criteria. Additionally, persons who have any of the subtype diagnoses may go on to have that subtype changed (e.g. from Predominately Inattentive type to Combined type). Important to the view of the development of person with ADHD is the description given by Hutchins (1994), in which he describes the dichotomous symptoms of persons with and without hyperactivity-impulsivity and by Zgonc's Study (as

Main Symptoms	Impulsivity	Inattention
Behavior	Overactive	Sluggish
Model	Impulse Inhibition	Organization
Occurrence	Boys more than Girls	Boys more or equal to Girls
Language	Language Disorder	Subtle Deficits
Peers	Peer Rejection	Social Withdrawal
Comorbidity	Aggression, Conduct Disorder	Anxiety, Depression
Presentation	Behavior, early referral	Learning, late referral
Family Type	Discord / Anger	Stress / Frustration
Outcome	Persistence	Adjustment

Trait	Impulsivity	Inattention
Decision Making	Impulsive	Sluggish
Boundaries	Intrusive, Rebellious	Honors Boundaries, Polite, Obedient
Assertion	Bossy, Irritating	Underassertive, Docile, Overly Polite
Attention Seeking	Show-off, Egotistical, Best at Worst	Modest, Shy, Socially Withdrawn
Popularity	Attracts but does not Bond	Bonds but does not Attract

cited in Price, 1999)<sup>1</sup>.

**ETIOLOGY**

Although, the details of ADHD's etiology and pathophysiology are still being worked out, the available data implicate dysregulation of catecholaminergic systems. Several lines of data also implicate genes in the etiology of ADHD. The biological relatives of children with ADHD are at greater than normal risk for ADHD. Twin studies show ADHD to be highly

heritable while adoption studies suggest that biological, not adoptive, relationships mediate the familial transmission of the disorder. Although, ADHD's mechanism of inheritance is unknown, its high population prevalence (5% to 10%) and modest risk to first-degree relatives (about 15% to 20%) suggest that the mechanism of transmission is complex<sup>1</sup>. Consistent with the idea that ADHD is a complex, multifactorial disorder, the magnitude of the association between DRD4 and ADHD is small<sup>1</sup>. ADHD has also generated controversy as some believe that it does not exist, whereas others see the reluctance of clinicians to diagnose and treat it and denying effective health care to children. Epidemiological studies show that 3-5% of children of school age may be classified as having ADHD. No validated diagnostic test exists to confirm the clinical diagnosis<sup>3</sup>. The past 20 years have seen the development of diagnostic criteria in both Britain and America. In 1981, the criteria of the Diagnostic and Statistical Manual version III (DSM-III) departed from those of the International Classification of Diseases ninth edition (ICD-9) in creating subtypes of attention deficit disorder with and without hyperactivity. Meanwhile, the ICD-9 continued to emphasise "pervasive hyperactivity" as the hallmark of the so-called hyperactive syndrome. Now, however, DSM-IV and ICD-10 research criteria for attention deficit hyperactivity disorder and hyperkinetic disorder are almost identical, showing a rapprochement between American and British approaches<sup>4</sup>.

**PREVALENCE OF ADHD**

About 1.6 million cases of ADHD have been diagnosed in American elementary school children, according to the Centers for Disease Control and Prevention (CDC). A recent study conducted at the Mayo Clinic has found that ADHD affects up to 7.5% of school age children. Previous studies had estimated the occurrence of ADHD between 1% and 20% of school age children<sup>5</sup>.

**Gender Differences:** ADHD expresses itself similarly in boys and girls relative to comparison subjects of the same gender indicating that ADHD associated impairments are correlates of ADHD in both boys and girls. However, between-gender differences are identified among the children with ADHD such as the higher rate among girls of symptoms of inattention and lower rates of co-morbidity with disruptive behavior disorders, major depression and learning disabilities. Since these differences are attributable to the main effects of gender rather than modification of the ADHD effect by gender, these findings indicate that girls are at the same relative risk for these adverse outcomes as boys but that girls have different clinical presentations. ADHD in girls is more likely to be predominantly the inattentive subtype, less

likely to be associated with a learning disability in reading or mathematics and less likely to be associated with problems in school or fewer spare-time activities than ADHD in boys<sup>6</sup>.

**Co-morbidity:** Recent studies have shown that ADHD is associated with significant impairment in multiple domains of functioning including a high frequency of psychiatric co-morbidity with disruptive mood and anxiety disorders, poor educational attainment, lower IQ and low occupational performance. ADHD is also associated with maladaptive interpersonal interactions and low self-esteem. Among children with ADHD, the presence of co-morbid psychiatric disorders predict both the persistence of ADHD into adulthood and a more complicated course with poorer outcomes. If pediatric samples of children with ADHD were found to have rates of co-morbid psychiatric disorders similar to those seen in psychiatric samples, the implication would be that pediatric patients with ADHD may have an equally high risk of experiencing a complicated course and compromised outcome<sup>7</sup>. Substance abuse has also been found common among 75% of boys with ADHD that were not on medication and 25% of boys with ADHD on medication having at least one substance abuse disorder, compared to 18% of the boys without. It has been noted that adults with ADHD develop substance abuse disorders at nearly twice the rate of their non-ADHD peers. Learning disabilities are also notable among those with ADHD.

**Learning and Standardized Test Performance:** Learning disabilities can be shown through the results of Weschler Intelligence Scales for Children-III (WISC-III) where normal children outperform those with ADHD on 31 separate neuropsychological variables. Adults with ADHD also fare poorly on intelligence tests such as the Weschler Adult Intelligence Scales-III (WAIS-III). As a result of these lowered academic and standardized test scores, a high number of ADHD children are placed in special education settings. However, it has not been defined as to whether these children are in need of special education due to their ADHD or a co-morbid condition. Finally, Weiss (1996) classifies those with ADHD as trainable, not educable, with the difference being that those who are educable can learn by being told, and those that are trainable learn by doing with repetition.

**Social Skills:** When "Social skills were defined as cognitive and overt behaviors a person uses interpersonal interactions and can range from simple nonverbal behaviors such as eye contact and head nods to the complex verbal behavior of offering a compromise that will meet everyone's needs" (Schumaker and Deshler, 1995), children with learning disabilities including ADHD were found to be

behind their peers. The hierarchy proposed by Guevremont and Dumas (1994) shows four domains in which children of ADHD have social difficulty. It includes high-rate intrusive behavior, deficient communication skills, biased and deficient social cognitive skills and poor emotional regulation. The generalization of social skills from a taught singular situation to larger settings is also decreased. As a result of lack of these skills, the tendency is to act in an antisocial as opposed to prosocial manner. More specifically, Hubbard and Newcomb (1999) have reported that when ADHD children are in playgroups with normal children, the rates of solitary play increase and the rate of verbalization decrease. However, the team of Schumaker and Deshler (1995) shows that these skills are teachable with a high rate of success when done properly.

### ADHD IN CHILDHOOD

In childhood, the effects of ADHD are far reaching, touching every aspect of the child's life. Social skills are decreased, learning ability is lessened and self-esteem is lowered. Guevremont and Dumas (1994) estimate that 50% of children with ADHD have significant difficulties in peer and social relationships and it has been noted by many studies that these children may be viewed negatively by their peers. Children with ADHD are placed in alternative educational settings within the schools. This has the potential to further demoralize a student and lower their self-esteem more and facilitate the ongoing under-education of these students.

**Adulthood:** Entering adulthood, the estimates of those persisting with diagnosable ADHD vary from approximately one-third of those diagnosed with ADHD in childhood still meeting the criteria in adulthood to nearly 70% (Barkley, 1998; Driggs, 1995). Meanwhile, Shaughnessy and Martin (1998) also believe that those who do not "outgrow" ADHD by adulthood have a considerable lessening of the hyperactivity portion of their disease<sup>8</sup>.

### MANAGEMENT OF ADHD

Pharmacotherapy, particularly use of stimulants has been extensively studied and generally provides significant symptomatic and academic improvement<sup>2</sup>. Treatment generally involves pharmacotherapy with stimulants, although behavior therapy and parent training are often used as well<sup>9</sup>. The evidence from the meta-analysis confirming the protective effect of stimulant therapy for ADHD against substance use disorder is of great significance, both clinically and from the perspective of public health<sup>10</sup>. Approaches to treatment have also progressed by time. An important advance was the use of systematic behavior modification techniques in the management of disruptive classroom behavior. In

America and Australia, however, management has been characterized by an increasing use of stimulant medications such as methylphenidate and dexamphetamine, with 3-5% of primary schoolchildren treated in some American States. Many studies have shown positive effects of stimulant medication in most children diagnosed with ADHD. Concerns about addiction have not proved justified. If the drugs are properly prescribed side effects are not a major concern, although morbidity in terms of appetite, dysphoria, headache and tics should be carefully monitored<sup>11,12</sup>.

## CONCLUSION

As children with attention difficulties are followed over time, it has become clear that these problems can be quite persistent and associated with a range of difficulties in adulthood. Research on adults with ADHD has the potential for elucidating mechanisms that may account for persistence of the disorder. Recently, Ernst and colleagues worked on neural substrates of decision making in adults with ADHD and found differences in brain regions activated during the decision-making task suggesting that the neural circuits underlying decision-making differ in adults with ADHD. This observation may also have implications for developing new treatment strategies. Although, minimal brain dysfunction has long been discarded as a diagnostic term, these findings remind the importance of brain mechanisms in understanding clinical disorder<sup>2</sup>.

ADHD affects the sufferer throughout the lifespan, from home-life to academics to social contacts, produces risks for other conditions and finally to the self-worth. Whether it is a label or a medical diagnosis, we have the capability to treat this condition through the use of psychoactive medications and therapy (individual, marital and

group). Moreover, we need to allow the ADHD sufferer to access this care in order to provide a fuller life for themselves and for those around them while lessening the stigma that is still attached to this disorder.

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