

## WHAT'S NEW IN ATTENTION DEFICIT HYPERACTIVITY DISORDER?

Attention Deficit Hyperactivity Disorder (ADHD) is a common disorder in children, well known to educators and to the general public and extensively studied by researchers. The prevalence in the U.S. is between 4 and 10%, with a predominance in boys, 9:1 in clinical samples, 4:1 in epidemiologic ones. The child with overactive behaviors has previously had various diagnostic labels, some of which implied causation, such as Minimal Brain Damage, later changed to Minimal Brain Dysfunction. The current diagnostic formulation of Attention Deficit Hyperactivity Disorder is descriptive and based on observable behaviors. The criteria are published in the American Psychiatric Association's Diagnostic and Statistical Manual IV (Figure 1). The diagnosis is based on behaviors which were noted before age 7 years, are present in more than one setting, persist for at least 6 months and cause significant impairment in social or academic functioning or marked distress. Children may have ADHD hyperactive/impulsive type, inattentive type, or combined. Those working with preschool children will immediately recognize that the criteria for inattention are difficult to apply to young children, an issue which is being addressed in new research.

The focus of this article will be on four areas of new work in ADHD:

1. Accumulating evidence that ADHD is a valid medical diagnosis.
2. The importance of co-morbidity. Recognition that other significant psychiatric conditions often co-exist with ADHD.
3. The efficacy of stimulant medication (Ritalin, Dexedrine). Excellent new National Institute of Mental Health (NIMH) research has shown that well managed stimulant medication can "normalize" the behavior of children with ADHD.
4. Increasing focus on diagnosis and treatment of ADHD in young children.

### Validity of the Diagnosis

The popular press and television often carry articles and programs debunking the existence of ADHD and suggesting that the diagnosis is a way for schools to blame children for the educators' shortcomings and a way for doctors to push medication. Since there is currently no laboratory test for ADHD and the diagnosis is made by behavioral description, it is essential to collect information carefully from more than one setting and to apply formal criteria in making the diagnosis. However, there is accumulating evidence that rigorously diagnosed ADHD is a medical condition which has a genetic

**FIGURE 1**

### Attention -Deficit/Hyperactivity Disorder DSM IV Criteria

**Inattention** – 6 or more of the following

**Often:**

- fails to give close attention to details
- has difficulty sustaining attention for tasks or play
- does not seem to listen when spoken to directly
- does not follow through on instructions, fails to finish tasks
- has difficulty organizing tasks & activities
- avoids tasks requiring sustained mental effort
- loses things necessary for tasks or activities
- easily distracted by extraneous stimuli
- forgetful in daily activities

**Hyperactivity -Impulsivity** – 6 or more of the following  
**Hyperactivity**

**Often:**

- fidgets with hands or feet or squirms in seat
- leaves seat when remaining seated is expected
- runs or climbs excessively where it is inappropriate
- difficulty engaging in leisure activities quietly
- "on the go", "driven by a motor"
- talks excessively

**Impulsivity**

**Often:**

- blurts out answers before questions are completed
- difficulty awaiting turn
- interrupts (butts into conversations or games)

(Some statements of symptoms have been abbreviated.)

component. It tends to run in families and has been shown to be more prevalent in the biologic relatives of children than in adopting relatives. It is also more prevalent in identical twins, who have the same genetic make-up, than in fraternal twins, whose genetic characteristics are only as similar as those of any two siblings.

A biochemical marker has been found in some individuals with ADHD, consisting of an abnormality in the dopamine D4 receptor. This marker is currently under investigation in the Genetics Division of the NIMH. Abnormalities have also been found in the brains of some individuals with ADHD, but neither of these tests is ready for clinical use, and researchers continue to recognize that environmental factors also contribute to the symptoms. Follow-up studies show that most children carefully diagnosed with this disorder continue to manifest it at least to age 18.

### Co-morbidity

In the older literature the diagnosis of an attentional problem was questioned if the child was aggressive, or appeared anxious or depressed. However, studies over the past decade, spearheaded by the work of Harvard researchers (see Spencer et al. reference), have shown that there are children who meet criteria for both ADHD and for other diagnoses. Recognizing each diagnosis is

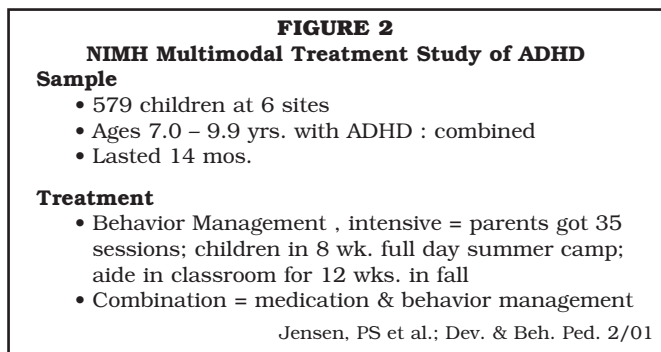
important for treatment and affects outcome. In the most recent large study of intervention for ADHD, the Multimodal Treatment Study of ADHD (Figure 2) only 32% of the children had ADHD alone. Forty percent had an additional diagnosis of Oppositional Defiant Disorder, 39% of Anxiety Disorder, 14% of Conduct Disorder, 11% had Tic Disorder and 4% had Mood Disorder. (Some children had more than two diagnoses.) Additionally, based on the literature, 10-25% of children with ADHD have learning disabilities.

As mentioned before, ADHD tends to persist over time, with 85% persistence over 4 years in the Harvard study. The factors which predicted persistence were positive family history of the disorder, psychosocial adversity and psychiatric co-morbidity.

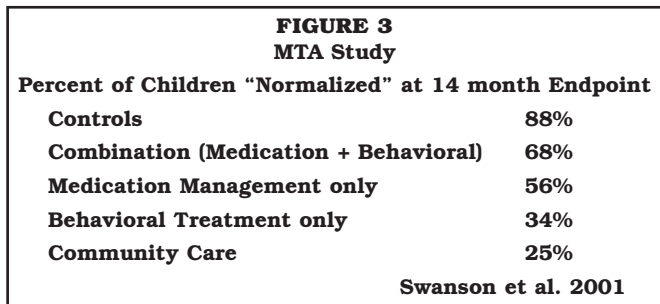
**Efficacy of Medication**

ADHD is a persistent condition with serious consequences for the child’s functioning. Both medications and behavioral treatments have been used, with varying degrees of improvement. The medications used most are the stimulants methylphenidate (Ritalin) and dextroamphetamine (Dexedrine), both of which have abuse potential. They act by blocking the re-uptake of dopamine and norepinephrine at the presynaptic junction, thus prolonging the action of these naturally occurring neurotransmitters.

The NIMH’s Multimodal Treatment Study of ADHD (Figure 2) set out to answer the following questions: “What treatment works best, for whom and for how long?”. It focused on the two treatments used most often, stimulant medication and behavior management, and continued them for 14 months (which is far longer than most treatment studies). The medication management involved more frequent and longer visits than is the usual community practice, and closer coordination with the child’s school. The behavior management was intensive, consisting of 35 parent sessions, an 8-week full-day therapeutic summer camp, and the provision of an aide in the child’s classroom for 12 weeks in the fall. Children with ADHD combined type were assigned to behavior management only, medication only, a combination of both, or a community care group. The latter group was diagnosed by the researchers and then received standard community services. The functional outcome of the study children was compared to a control group of children in whom ADHD was ruled out and who were classmates of the study children.



The results (Figure 3) show that for the symptoms of ADHD, medication with or without behavior management was substantially superior treatment. Behavior management, with or without medication, preferentially benefited children with co-existing anxiety disorders. A combination of both treatments was slightly better than medication alone for social skills, academics, parent child relations and oppositional behavior. The improved response seen in the groups getting behavior management was mediated by changes in parental attitudes and disciplinary practices. Figure 3 shows the percentage of children whose behavior was “normalized” at the end of the study, meaning they had few or no symptoms.



The short answer to the MTA’s questions is that well managed stimulant medication works for the symptoms of ADHD and behavior management has added benefits, particularly for those with co-existing anxiety disorder.

**Preschool Age**

The MTA studied children at least 7 years old and it is not clear that those results can be generalized to preschool children. However, parental and educators’ complaints of overactive, impulsive, disobedient and aggressive behavior in preschool children is common and presents significant problems to the child and family.

Ruff and Rothbart have studied the normal development of attention in infants and young children. Focused attention in the first year of life is based on the orienting response and largely determined by the features of the stimulus, such as its intensity, novelty and complexity. Toddlers respond not only to the characteristics of the stimulus, but begin to attend more to what others, especially their caregivers, are attending to. As children get older they develop the more mature capacity to inhibit automatic responses to environmental stimuli when focusing on a specific task or activity. This inhibitory capacity is a necessary skill for academic learning, and a limited ability to inhibit automatic responses shows up as inattention.

Connors reported that infant temperamental characteristics of high activity level, low adaptability, short attention and overreaction to stimuli tend to persist to early childhood. At this later age they manifest as non-compliance, hyperactivity and inattentiveness. These behaviors may not necessarily fulfill criteria for ADHD since in preschool children with various psychiatric problems, gross motor overactivity and aggression are common.

Both current and older studies report that school age children with ADHD frequently have had symptoms typical of ADHD in the preschool years, and the symptoms were severe enough to interfere with functioning. As mentioned previously, the DSM IV criteria for hyperactivity/impulsivity are generally applicable to preschoolers while the criteria for inattention have items referring to tasks not expected of preschoolers. More appropriate items might succeed in identifying inattentive behaviors in this age group.

Stimulant medication has been studied in preschool children but the studies are few in number, each treating only a small number of children, so that results are still inconclusive. In clinical practice stimulant medication is being used for preschoolers as documented by the literature. At our center, the children have to meet diagnostic criteria for ADHD, at least the hyperactive/impulsive type. We always start with behavioral interventions first and we seldom use medication on children below age 5 years. The NIMH is planning a large study of ADHD in preschoolers and new information will become available in the future.

Though ADHD is a familiar condition, there are important new developments in our understanding of this problem. The new information shows that the construct appears to be valid, it's a real condition which persists and interferes with a child's functioning; more often than not it is accompanied by other psychiatric conditions, whose identification and treatment are necessary for optimal results; stimulant medication works when it is well managed; symptoms are often identified in the preschool years, but there are unanswered questions about the diagnosis and treatment of preschoolers who manifest them.

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