An Update on the Diagnosis and Treatment of Attention-Deficit/Hyperactivity Disorder in Children

Richard W. Root II
Springfield, Vermont

Robert J. Resnick
Randolph-Macon College and Dominion Behavioral Healthcare

What are the most appropriate empirically supported diagnostic and treatment approaches to children with attention-deficit/hyperactivity disorder (ADHD)? This article summarizes the nomenclature, prevalence and course, comorbidity, etiology, assessment, and federal laws associated with ADHD. The authors then review clinical research and consensus guidelines for the treatment of ADHD, including the largest randomized treatment study completed on ADHD (MTA Cooperative Group, 1999a). The empirical evidence supports either a behavioral–psychosocial or a combined behavioral–psychosocial and medication intervention in the treatment of children with ADHD.

Thomas S. Kuhn (1962) wrote eloquently regarding the process and structure of scientific change 40 years ago. Initial interpretation of the Multimodal Treatment Study of Attention-Deficit/ Hyperactivity Disorder (MTA; MTA Cooperative Group, 1999a) presented somewhat of a Kuhnian crisis to the accepted and empirically supported approaches to the treatment of attention-deficit/hyperactivity disorder (ADHD), with its finding that medical management was significantly more effective for the core symptoms of ADHD than behavioral–psychosocial treatment. However, subsequent analyses of the MTA, as well as previous and subsequent research and consensus guidelines, have supported behavioral–psychosocial and combined behavioral–psychosocial and medication interventions as effective treatments for ADHD. This article, drawing on these findings and guidelines, describes the active roles psychologists take in providing the most reliable and valid diagnostic and treatment services for ADHD.

The Nomenclature of ADHD

The nomenclature for ADHD has undergone extensive conceptual change since 1980, when the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–III*; American Psychiatric Association, 1980) was first published. The *DSM–III* promulgated a new name (*attention-deficit disorder with hyperac-*

tivity and *attention-deficit disorder without hyperactivity*) and new diagnostic criteria for this disorder. For the first time, practicing psychologists had specific behavioral criteria to consider in their diagnosis of this disorder. Although there seemed to be much anecdotal support for this dichotomy, Barkley (1998) indicated that there was little empirical support for these labels when they were created. Published in 1987, the *DSM–III–R* no longer recognized attention-deficit disorder without hyperactivity, which was relegated to a poorly defined category, without diagnostic criteria, called *undifferentiated attention-deficit disorder*. All that remained officially was attention-deficit/hyperactivity disorder, which was considered a unidimensional disorder. The fourth edition of the *DSM* (*DSM–IV*) was published by the American Psychiatric Association in 1994 and enumerated three subtypes for ADHD: (a) predominantly inattentive type, (b) predominantly hyperactive/ impulsive type, and (c) combined type (which includes significant hyperactivity/impulsivity and inattention symptomatology).

In the *DSM–IV*, children must have six of nine symptoms to qualify for either the inattentive or hyperactive/impulsive subtypes of ADHD, and six of nine symptoms of both subtypes to qualify for the combined type. In addition, these symptoms must have been present before the age of 7; must create impairment in two or more settings (e.g., home, school, neighborhood); must cause clinically significant impairment in social, academic, or occupational functioning; and must not be better accounted for by any other disorder (e.g., posttraumatic stress disorder). There are several associated problems, such as speech and language delays, motor incoordination, poor regulation of emotion and low frustration tolerance, and increased risk of accidental injury (American Psychiatric Association, 2000; Farmer & Peterson, 1995).

The predominantly hyperactive/impulsive and combined subtypes have been more thoroughly researched both in terms of their core symptoms and associated characteristics and in terms of diagnostic and treatment issues (Barkley, 1998). Research has been supportive of the predominately inattentive subtype being a separate clinical entity, although there are unresolved issues, such as referral age, comorbid learning disabilities, and gender ratio (Morgan et al., 1996). Children with either the predominately

RICHARD W. ROOT II received his EdD in counseling psychology from Boston University. He is on the medical staff at Springfield Hospital in Springfield, VT, and Valley Regional Hospital in Claremont, NH. His clinical practice and research interests center on the assessment and treatment of attention-deficit/hyperactivity disorder (ADHD).

ROBERT J. RESNICK received his PhD from the University of Tennessee and is an ABPP in clinical psychology. He is a professor of psychology at Randolph-Macon College and has an ADHD life span specialty practice with Dominion Behavioral Healthcare.

CORRESPONDENCE CONCERNING THIS ARTICLE should be addressed to Richard W. Root II, Ridgewood Professional Building, P.O. Box 2003, Springfield, Vermont 05156, or to Robert J. Resnick, Dominion Behavioral Healthcare, 2305 North Parham Road, Number 3, Richmond, Virginia 23229. E-mail: docroot@vermontel.net or rresnick@rmc.edu

hyperactive/impulsive or combined subtype of ADHD often, as they mature, change in their presentation and meet the diagnostic criteria for the predominantly inattentive type of ADHD, as hyperactive and impulsive symptomatology is reduced or brought under better control (Goldstein & Goldstein, 1998). The younger the child, the more likely he or she will be diagnosed as predominantly hyperactive/impulsive (American Psychiatric Association, 2000; Barkley, 1998). The issue of the rate of age-dependent decline in ADHD remains unsettled within the professional literature particularly because the *DSM–IV* criteria are the same for children and adults. Many support a progression of the disorder, wherein children who are originally diagnosed with the hyperactive/impulsive type are found to display more of the inattentive symptomatology as they become older adolescents and adults (Resnick, 2000). This disorder is not "outgrown" in adulthood. Faraone et al. (2000) estimated that 10% to 60% of young adults with ADHD had the disorder as children. Further, they believe that up to 5% of adults have ADHD.

It is important to note that all children (and adults) have certain degrees of inattention, overactivity, and impulsivity in various situations. Individuals who are diagnosed with ADHD by rating scales are found to have symptoms between the 95th and 98th percentiles relative to others their age. Individuals who are at the 90th percentile relative to others their age may have significant adjustment problems, but they may not meet the diagnostic criteria for ADHD. Ultimately, the diagnosis of ADHD depends on the clinical judgment of the psychologist, taking into consideration data from several sources including rating scales.

We have noted that many patients, parents, and schools are confused by the language used in these labels. To be diagnosed as having ADHD of the inattentive type one is still called hyperactive, and to be hyperactive one is called hyperactive twice. As more than one parent of a child with the hyperactive/impulsive type of ADHD has stated, "So, if you say hyperactivity once you don't mean it, but if you say it twice, you do!"

The Prevalence and Course of ADHD

The prevalence of ADHD is conservatively estimated as being from 3% to 7% of the school-age children in the United States (American Psychiatric Association, 2000). Prevalence data on the frequency of ADHD in adolescence and adulthood are not conclusive. Barkley (1998) suggested that prevalence data are affected by the instruments used to determine the disorder and the diagnostic criteria used. The younger the child is, the more likely it is that he or she will be diagnosed as having the hyperactive/impulsive ADHD versus the inattentive or combined types (Barkley, 1998).

Although boys with ADHD outnumber girls, estimates of the ratio of boys to girls vary significantly. Ranges of 2:1 to 9:1 have been reported, with the gender difference less obvious for the inattentive type of ADHD (American Psychiatric Association, 2000). Boys are more likely to be aggressive and to have other behavioral problems (Gaub & Carlson, 1997). Girls can be overly talkative and overly social (Nadeau et al., 2000). Girls with ADHD demonstrate the same core symptoms and high levels of comorbid disorders as do boys (Biederman, Faraone, Mick, & Williamson, 1999). In community-based samples, the ratio of boys to girls is closer to 1:1; however, in clinic-based samples, it is about 6:1 because of the disruptive and noncompliant aspects of their be-

havior (Barkley, 1998). ADHD children make up 30% to 40% of referrals to child mental health practitioners (Barkley, 1998).

Determining the prevalence of ADHD in other countries and cultures has been problematic. Although there is general agreement that ADHD is a worldwide phenomenon (Barkley, 1998), it has been difficult to obtain and compare prevalence data.[1] As Gingerich, Turnock, Litfin, and Rosen (1998) pointed out, whereas some level of inattention, impulsivity, and overactive behaviors are unacceptable in most countries, the perception and severity of such behaviors vary greatly from culture to culture. Prevalence rates in other countries have been reported to be between 3% and 9.5%, roughly analogous to U.S. data (Gingerich et al., 1998). It has been difficult to make comparisons of prevalence measures because of differing criteria and methodology used in different cultures and ethnic groups in the United States (Gingerich et al., 1998).

In comparisons among African American, Chicano, and Asian American children, African American children have had the highest and Asian Americans the lowest incidence of hyperactivity. Other studies have found that African American boys had a high rate of ADHD diagnosis but suggested that their symptoms may be better accounted for by environmental factors (Barbarin & Soler, 1993, as cited in Gingerich et al., 1998). Samuel et al. (1999), however, reported that symptom presentation of ADHD among African American children is very similar to symptom presentation in White children; family history and treatment approaches are similar as well.

Gingerich et al. (1998) and Barkley (1998), among others, have reported increased incidence of ADHD in the lower socioeconomic class, a finding that is perhaps due to social drift (Barkley, 1998). That is, children with ADHD are less likely to benefit from their education and adapt less well in various situations. As a result, as adults they are underemployed, with the commensurate lower income, causing them to drift toward the lower socioeconomic class. Thus, although it is clear that there are cultural and ethnic differences in the "objective" assessment of ADHD, practitioners and researchers should be cognizant of and sensitive to the interaction and acceptance of ADHD symptoms and deviance within different cultural/ethnic groups.

Historically, it was believed that ADHD was outgrown in mid- to late adolescence. It is now clear that two thirds of children with ADHD will continue to have problems attributable to ADHD as adults and, because ADHD is a chronic disorder, will require treatment throughout their lives (Resnick, 2000).

Comorbidity With ADHD

About 44% of children with ADHD have a comorbid disorder, almost a third have two comorbid disorders, and approximately one tenth have three comorbid disorders (Szatmari, Offord, & Boyle, 1989). Goldstein and Goldstein (1998) reported that conduct disorder and oppositional defiant disorder are the most common comorbid disorders. Barkley (1998) indicated that about one

---

[1] The *DSM–IV* and the World Health Organization's *International Classification of Diseases* (10th ed.; *ICD–10*) define the disorder differently, making accurate comparisons between countries difficult. The nomenclature is also different (i.e., the term *hyperkinetic disorder* is used in the *ICD–10*).

quarter of children diagnosed with ADHD also meet the criteria for conduct disorder and about one third meet the criteria for oppositional deviant disorder. The rates of conduct disorder and oppositional deviant disorder for girls are about half that for boys. Some of these children may no longer meet criteria for conduct disorder or oppositional deviant disorder when the ADHD is appropriately treated. Similar high levels of comorbidity are found in both ADHD boys and girls (Biederman et al., 1999). Anxiety disorders and depression are seen in about one fourth of ADHD children, with somatization disorder being expressed in about one third of ADHD adolescents. Biederman, Milberger, and Faraone (1995) identified a number of children who have bipolar disorder as a comorbid disorder. Faraone et al. (1997) suggested that ADHD with bipolar disorder is a distinct subtype of ADHD. The question of comorbidity and prevalence remains very controversial (for further discussion, see Barkley, 1998, or Goldstein & Goldstein, 1998).

Learning disabilities (LD) are also a common comorbid disability for children with ADHD. An academic problem (often suspected to stem from a learning disability) frequently precipitates an evaluation that leads to a finding of inattentive ADHD. In a recent study Snider, Frankenburger, and Aspenson (2000) completed a national survey of LD teachers and found that 22% of students diagnosed with LD also were diagnosed with ADHD. They also reported that the incidence of this dual diagnosis has a national range of between 2% and 38%. Mental retardation may be a comorbid disorder; individuals who are mentally retarded and are being assessed for ADHD must be compared with other individuals with mental retardation in regards to their ADHD symptomatology. ADHD is found at comparable rates in individuals who are intellectually gifted. ADHD children are at significantly greater risk for having expressive language problems but no greater risk for receptive language problems.

A central auditory processing (CAP) disorder may be defined as "a deficiency in one or more of the following processes: sound localization and lateralization; auditory discrimination; auditory pattern recognition; temporal aspects (resolution, masking, integration, ordering) of audition; and auditory performance decrements with competing and degraded acoustic sounds" (Gomez & Condon, 1999). A CAP disorder involves seeming inattention and distractibility, and thus the differential diagnosis with ADHD may be confusing. In one study, the authors noted that central auditory processing disorder is more associated with learning disabilities than with ADHD (Gomez & Condon, 1999). However, Riccio et al. (1994) found in a small sample a significant comorbidity of ADHD and CAP disorder using *DSM–III* and/or *DSM–III–R* criteria. For the practitioner, differential diagnosis of ADHD should include elimination of a central auditory processing disorder as being the primary cause of ADHD symptomatology. Such a rule-out can be completed by professionals who do audiometric testing and are familiar with the diagnosis (Chermak, Hall, & Mussiek, 1999).

The Etiology of ADHD

When a diagnosis of ADHD is made, the first treatment strategy is educating the family and patient about the disorder. The following information is provided to help practitioners facilitate this educational process with the patient and his or her family. One fourth to one third of biological parents of children with ADHD are affected by ADHD themselves, suggesting a significant genetic component (Barkley, 1998; Biederman, Faraone, & Keenan, 1992). The chance of parents with a child who has ADHD having another child with ADHD is about 1 in 3 (Biederman et al., 1992). A dopamine transmitter gene (DAT-1) and a dopamine receptor gene (DRD-4), among others, have been linked to ADHD children and families (Elia, Ambrosini, & Rapoport, 1999). Twin studies demonstrate a heredity factor between 64% and 91% (Elia et al., 1999; Gillis, Ginger, Pennington, & De Fries, 1992; Goodman & Stevenson, 1989). For a time, interest was directed to the role of the thyroid releasing hormone (TRH), suggesting a causal link to ADHD (Hauser, Zametkin, & Martinez, 1993). Those findings have not been replicated, and resistance to TRH is quite rare among ADHD children; it is unlikely that thyroid disease or malfunction is a significant cause of ADHD (Elia, Gulotta, Rose, Marin, & Rapoport, 1994). It is mentioned here only because some parents continue to ask about this possible cause of ADHD.

Electrophysiological research (Cohen, 1993) has shown that autonomic indices, such as orienting response habituation, of individuals with ADHD are less responsive to salient informative stimuli than are the autonomic indices of non-ADHD individuals. EEG event-related potentials suggest an arousal dysfunction related to hyporeactivity to salient informative stimuli. Thus, the individual with ADHD is relatively unaware of his or her sensations of salient informative stimuli. This results in the paradoxical reaction to stimulant medication where individuals with ADHD become less instead of more active after taking stimulant medication, as they become more attentive to salient informative stimuli.

Environmental toxins may have an etiological role in the development of ADHD. Consumption of lead, usually from lead-based wall paint, has been linked to the development of ADHD (see Goldstein & Goldstein, 1998). Prenatal exposure to alcohol and tobacco are also considered risk factors, as is any significant anomaly that occurs during gestation or delivery. Biederman et al. (1995) indicated that family–environment variables such as severe marital discord, large family size, paternal criminality, maternal mental disorder, and foster care placement are significant risk factors in the development of ADHD.

The Assessment of ADHD

The child should have a physical exam to rule out medical problems that may cause or relate to ADHD symptomatology. The physical would also serve to alert the psychologist to any coexisting medical problems that will need ongoing medical management or impact on the treatment of an ADHD child, as well as to establish the physician as a member of the diagnostic/treatment team process.

The assessment of ADHD involves establishing that the child has significant developmentally inappropriate levels of inattention and/or impulsivity/overactivity that are not better accounted for by learning disabilities, trauma, stress, depression, anxiety, and so forth. Information can be gained through interview from at least three sources: parent(s), child, and teacher(s). These clinical interviews can be structured or unstructured and are the most important part of the evaluation process. The use of child behavioral rating scales by parents and teachers is, also, an important part of the assessment. A fourth source of information is the review of the

child's complete school and health records, including report cards, achievement testing, psychoeducational assessments, and medical and psychological treatment records.

Psychological tests are a fifth source of data. Some of the instruments that have been used in assessing ADHD are the Continuous Performance Test (CPT), the Freedom From Distractibility Index of the Wechsler Intelligence Scale for Children—III, Porteus mazes, the Rey–Osterrieth Complex Figure Test, the Trail Making Test (A and B), the Matching Familiar Figures Test, the Wisconsin Selective Reminding Test, the Wisconsin Card Sorting Test, the Controlled Oral Word Association Test, the Stroop Word–Color Association Test, and the Hand Movements Test. In their recent review of the CPT, the most popular and most frequently used test for ADHD, O'Laughlin and Murphy (2000) concluded that it is a valuable measure that provides useful information when used in conjunction with other assessment data. The CPT, these authors pointed out, is also effective in monitoring response to medication. The predictive power of the CPT and other psychological and neuropsychological tests is not at the level where the diagnosis of ADHD can be ruled in or out solely by these instruments (Barkley, 1994; McGee et al., 2000), and thus, they have greater predictive validity when used in combination with other measures (Perugini, Harvey, Lovejoy, Sandstrom, & Webb, 2000). The CPT has a high rate of false negatives (Barkley, 1998). Psychological testing using the CPT provides important descriptive information regarding children's ability to sustain their attention and inhibit their impulsivity, their flexibility in thinking and reasoning, their ability to shift their attention, and their ability to continuously perform tasks. Additional psychological testing may be necessary to assess whether the individual has learning disabilities or psychological disorders that may better account for what seemingly are ADHD symptoms. Such testing is helpful in the assessment process, although these measures do not allow the practitioner to differentially diagnose ADHD without other assessment information, as reviewed above.

Behavioral observations of the child and of parent–child interactions, informally while in the waiting room and as part of the interview as well as formally through assigned tasks for parent and child to complete together, may be useful. They may aid in assessing ADHD symptoms as well as comorbid oppositional defiant disorder and conduct disorder symptoms.

An encouraging recent development in the assessment of individuals for ADHD is the quantitative electroencephalographic (QEEG) procedure. Although it requires specialized equipment and training, Monastra, Lubar, and Linden (2001) have demonstrated electrophysiological "slowing" that differentiates ADHD from nonclinical controls with significant specificity. However, the sensitivity and specificity of the QEEG with patients with ADHD and comorbid conditions, and with psychiatric patients with disorders other than ADHD, has not been demonstrated.

ADHD and Federal Law

A child diagnosed with ADHD has certain rights under three federal statutes. Section 504 of the 1973 Rehabilitation Act prohibits schools from discriminating against people with handicaps. Schools receiving any federal funds must provide an "equal education" for individuals with ADHD under this statute. The Individuals With Disabilities Education Act (IDEA) is similar to

Section 504 in that it provides for a free and appropriate public education for the ADHD child and adolescent. IDEA goes further and mandates a multidisciplinary evaluation process and the development of an individualized educational plan for each ADHD student. The Americans With Disabilities Act (ADA) requires that "reasonable accommodations" be made for individuals who have a substantial limitation of a major life activity. Learning (which can be impaired by ADHD) has been defined as a "major life activity" (for further discussion, see Latham & Latham, 1992, and Roberts & Mather, 1995). Local bar associations can provide names of attorneys who have expertise in such matters. State departments of education also can be a helpful resource to clinicians and parents.

Clinical Research and Consensus Guidelines Supportive of Behavioral–Psychosocial Treatment for ADHD

Clinical research and consensus guidelines on the treatment of ADHD[2] over the past few years have increasingly clarified the most effective treatment approaches. This review supports the primary thesis of this article, which is that behavioral–psychosocial treatment is empirically supported in treating many types of patients with ADHD. We survey below several studies and guidelines and provide a more in depth review of the MTA (MTA Cooperative Group, 1999a).

Reviews by Hinshaw, Klein, and Abikoff (1998), Pelham and Hinshaw (1992), and Pelham and Murphy (1986), as reviewed in Wells (2000), suggest that empirically validated behavioral–psychosocial treatments for ADHD are of two broad types. The first is *clinical behavioral psychotherapy*. These studies involve parent and teacher training and consultation in outpatient settings and have found significant improvements in child behavior across a wide range of domains in both home and school settings on behavior checklists and through observation. Aggressive classroom behavior has been found to be normalized with clinical behavioral–psychotherapeutic treatment alone. There is evidence from these studies that combined clinical behavioral–psychotherapeutic treatment and medication treatment are superior over either alone. An example of a manualized clinical behavioral psychotherapy program is Barkley's defiant children parent training program (Barkley, 1987).

The second type is *direct contingency management*. These studies have been completed in institutions where close control of contingencies is possible and generally yield more significant results than clinical behavioral psychotherapy. Improvements found are typically at the same levels as low-dose medication alone; when low-dose medications and direct contingency management are combined, the effects are similar to those produced with high-dose medication. An example of a direct contingency management program is Pelham's summer treatment program (Pelham, 2000).

The American Academy of Child and Adolescent Psychiatry (AACAP; 1997) parameters for treating ADHD stress the importance of support and education of parents and teachers in effective behavioral–psychosocial treatment of ADHD. They recognize the need for psychological assessment when appropriate. The academy

---

[2] This review primarily focuses on the impulsive/overactive and combined subtypes of ADHD and not on the inattentive subtype of ADHD.

recently offered practice parameters for the use of stimulant medications derived from a detailed literature review and expert consultation (AACAP, 2002).

A consensus statement issued by the National Institutes of Health (1998) on the diagnosis and treatment of ADHD noted that studies (primarily short term, approximately 3 months), including randomized clinical trials, have established the efficacy of behavioral–psychosocial and stimulants treatments for alleviating the symptoms of ADHD. Behavioral–psychosocial treatment programs were reported to be effective in the management of many ADHD comorbid conditions (e.g., a child's deviant behavior). We have found in our practice, similar to Anastopoulos (2000) and Hinshaw (2000), that the core symptoms of ADHD are seldom the sole focus of treatment interventions. This consensus statement suggests that the dispute between managed care companies and educational agencies regarding the responsibility for coverage of the costs of special educational services for ADHD represents a considerable long-term cost to society.

The Multimodal Treatment Study of Attention-Deficit/Hyperactivity Disorder (MTA), sponsored by the National Institute of Mental Health and Department of Education, is the largest randomized treatment study ever undertaken of any childhood psychological or psychiatric disorder (MTA Cooperative Group, 1999a). At each of six sites around the United States and Canada, at least 96 children (total sample = 579) between 7 and 9.9 years of age having the combined type of ADHD were randomized to four treatment groups. Subjects in the community care (CC) group (which served as a contrast/control group) were referred to existing community mental health resources (67% of subjects received some type of psychiatric medication). The second (MED) group received medication alone, with a rigorous double-blind protocol lasting 28 days for different levels of methylphenidate; they were subsequently seen monthly for medication monitoring. The third (BEH) group received a behavioral–psychosocial treatment program, which included three components: (a) parent training classes; (b) an intensive 8 week all-day summer treatment program (STP), based mainly on Pelham's (2000) STP approach; (c) school-based interventions including teacher consultation, a classroom aide, and a daily school report card. The fourth treatment group (COMB) received a combination of the BEH and MED group treatment procedures.

In the initial report, the MTA group used an "intent-to-treat" analytic approach that examined multiple measures of various domains of functioning. These outcome measures allowed for measurement of specific effects from each of the various treatments. They found that the COMB and MED groups had significantly greater improvement than the BEH or CC groups on core ADHD symptoms, although the COMB and MED groups didn't differ statistically in level of improvement (MTA Cooperative Group, 1999a). However, Conners, Epstein, and Marsh (2001) subsequently used a single outcome "composite score" analytic approach obtained from combining parent and teacher measures. This outcome measure allowed for measurement using a single composite outcome measure. They found the COMB treatment to be superior statistically to all other treatments. The COMB treatment approach produced about 12% more successes than the MED treatment approach alone (68% vs. 56%), which represented a 21.4% increase in the rate of excellent response (Swanson, Kraemer, & Hinshaw, 2001). Also, the COMB outcomes were

achieved with significantly lower medication doses than were used in the MED treatment (MTA Cooperative Group, 1999a). Conners, Epstein, and March (2001) reviewed various reasons for the increasing use of single composite outcome measures of treatment effects in medical and psychiatric conditions; they argued that a composite measure should be particularly applicable to ADHD.

While recognizing the many strengths of the MTA cooperative study, psychologists have raised several concerns regarding the research design of the study. Anastopoulos (2000) pointed out that the MED treatment always preceded the BEH treatment within the COMB treatment group, raising the question of whether this ordering made any difference in the findings. The decision to fade the psychosocial intervention in the BEH and COMB treatments and to continue the MED intervention at the treatment level throughout the study may have biased the outcome in favor of the effects of medication (National Institutes of Health, 2000). Hoza (2001) noted the following concerns: (a) the MED and BEH treatment groups were not individualized to comparable degrees, (b) cognitive–behavioral interventions were not incorporated to an adequate extent, and (c) core ADHD symptoms were overemphasized relative to other functional domains, both as treatment targets and as outcome measures. Secondary analyses (Swanson et al., 2001) suggested that the inability to show that BEH was superior to CC may relate to "local conditions," for example, the frequency and quality of BEH treatments used within the MTA study at the six different study sites. Their reanalysis of the data showed that moderate to large positive effects occurred at three of the study sites from BEH treatment relative to CC treatment in contrast to small to large negative effects at the other three sites.

The American Academy of Pediatrics (2000, 2001) provided guidelines for the diagnosis and treatment of ADHD in school-age children. These guidelines recommend applying *DSM–IV* diagnostic criteria, obtaining information from teachers and parents, and using rating scales to establish the level of developmental inappropriateness of ADHD symptomatology. They recognize that ADHD is a chronic disorder necessitating ongoing medication and behavioral–psychosocial treatment.

Conners, March, Frances, Wells, and Ross (2001) noted that ADHD is diagnosed and treated quite variably in primary care settings. They, with other colleagues, developed expert consensus guidelines (which were influenced by the MTA study) for the diagnosis and treatment of ADHD through surveying 50 psychologists and 51 physicians who were considered to be expert clinicians and/or researchers in the field of ADHD. These guidelines indicate that behavioral–psychosocial treatment is an appropriate first-level treatment in the following instances:

1. For milder ADHD.

2. For preschool-age children with ADHD.

3. When there is the presence of comorbid internalizing disorders.

4. When there is the presence of comorbid social skill deficits.

5. When the family prefers psychosocial treatment.

Experts agreed that starting with the combination of both med-

ication and psychosocial treatment is favored in most situations, especially the following:

1. For more severe cases of ADHD.

2. Where significant aggression or severe problems in school are present.

3. Where there is severe family disruption caused by ADHD symptoms.

4. Where there is a need for a rapid response.

5. For all three types of ADHD, especially the combined type.

6. For all age groups except preschool.

7. With the presence of comorbid externalizing disorders, mental retardation, or central nervous system problems (e.g., epilepsy, migraine).

Treatment Implications

A behavioral–psychosocial treatment intervention is often the preference of parents, and as reviewed above, it has strong empirical support for children with ADHD of a mild to moderate severity level, for preschool-age children, for children with comorbid internalizing disorders (e.g., anxiety disorders[3]), and for children with social skill deficits.

A combined behavioral–psychosocial and medication approach, when preferred by parents, is appropriate for more severe cases of ADHD, when aggression management problems are present, when there is severe family disruption caused by ADHD symptoms, when a rapid response is needed, and when there are significant comorbid externalizing disorders, mental retardation, reading achievement, or central nervous system problems (e.g., epilepsy, migraine) present. The satisfaction levels of parents and teachers with treatment are greater when a behavioral–psychosocial treatment component is part of the treatment program for the child with ADHD, thus likely increasing treatment compliance (MTA Cooperative Group, 1999a; Pelham, 2000; Pelham, Greiner, & MTA Cooperative Group, 2000). Given the widely recognized chronicity of ADHD (American Academy of Pediatrics, 2000), including an ongoing behavioral–psychosocial treatment component in the treatment of children with ADHD will lead to increased treatment compliance and to the child more quickly developing effective behavioral–psychosocial skills. A combined behavioral–psychosocial and medication approach allows significantly lower doses of medication than a medication-only approach in achieving treatment outcomes, thus minimizing side effects (Pelham, 2000; Whalen, 2001).

A medication-only approach, if this is the parent's preference, also has empirical support for the core symptoms of ADHD. However, as noted, a behavioral–psychosocial or combined behavioral–psychosocial and medication approach is more effective for dealing with the various comorbid problems that a large proportion of children with ADHD have, and to enhance treatment compliance. Families in the MTA study (MTA Cooperative Group, 1999a) found the systematic, placebo-controlled trial of medication more acceptable and more reassuring than an open titration of medication. Barkley (1977) documented the robust response to a placebo dosage of stimulant medication, finding that from 10% to 50% of adults ranked children in this condition as improved. Thus, as described by Barkley (1988) and Root, Hammond, Owen, and Clattenburg (1988), psychologists have a significant professional role in carrying out multimethod blind studies determining the effectiveness of various levels of medications through their work with primary care providers. Psychological assessment provides the most reliable and valid assessment of the effects of medication, and parents, primary care providers, child psychiatrists, teachers, and others appreciate this level of assessment of the effects of medication on their child.

In conclusion, psychological evaluation or consultation that includes psychological testing is an empirically proven, highly reliable and valid, and descriptive diagnostic procedure for the assessment of a child suspected of having ADHD. A behavioral–psychosocial intervention as the first level of treatment is supported in the literature for the child with mild to moderate levels of ADHD, for the preschool-age child, and where there are comorbid internalizing disorders or social skill deficits. Parents often prefer this treatment approach as the first level of treatment for their child. Psychologists can have confidence that they are providing empirically supported psychotherapeutic services to clients when they provide behavioral–psychosocial interventions, as outlined above, with or without medication. Children who have more severe levels of ADHD symptomatology will benefit from a combination medication and behavioral–psychosocial treatment paradigm.

---

[3] It is of note that BEH treatments in the MTA were targeting such areas as aggression, academic productivity, and social skills and did not target specific treatment for anxiety or other internalizing disorders (MTA Cooperative Group, 1999b).

References

American Academy of Child and Adolescent Psychiatry. (1997). Practice parameters for the assessment and treatment of children, adolescents, and adults with attention-deficit/hyperactivity disorder. *Journal of the Academy of Child and Adolescent Psychiatry, 36*(Suppl.), 85S–121S.

American Academy of Child and Adolescent Psychiatry. (2002). Practice parameters for the use of stimulant medications in the treatment of children, adolescents and adults. *Journal of the Academy of Child and Adolescent Psychiatry, 41*(Suppl.), 26S–49S.

American Academy of Pediatrics. (2000). Clinical practice guidelines for the diagnosis and evaluation of children with ADHD. *Pediatrics, 105*, 1158–1170.

American Academy of Pediatrics. (2001). Clinical practice guidelines: Treatment of the school-aged child with ADHD. *Pediatrics, 106,* 1033–1044.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Anastopoulos, A. D. (2000). The MTA study and parent training in managing ADHD. *ADHD Report, 8,* 7–9.

Barbarin, O. A., & Soler, R. E. (1993). Behavioral, emotional, and academic adjustment in a national probability sample of African American children: Effects of age, gender, and family structure. *Journal of Black Psychology, 19,* 423–446.

Barkley, R. (1977). A review of stimulant drug research with hyperactive children. *Journal of Child Psychology and Psychiatry, 18,* 137–165.

Barkley, R. A. (1987). *Defiant children: A clinician's manual for parent training.* New York: Guilford Press.

Barkley, R. A. (1988). Development of a multimethod clinical protocol for assessing stimulant drug response in children with attention deficit disorder. *Journal of Clinical Child Psychology, 17,* 14–24.

Barkley, R. A. (1994). Can neuropsychological tests help diagnose ADHD? *ADHD Report, 2*(1), 1–3.

Barkley, R. A. (1998). *Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment* (2nd ed.). New York: Guilford Press.

Biederman, J., Faraone, S., & Keenan, K. (1992). Further evidence for family-genetic risk factors in attention deficit hyperactivity disorder. *Archives of General Psychiatry, 49,* 728–738.

Biederman, J., Faraone, S., Mick, E., & Williamson, S. (1999). Clinical correlates of ADHD in females: Findings from a large group of girls ascertained from pediatric and psychiatric referral sources. *Journal of the American Academy of Child and Adolescent Psychiatry, 38,* 966–975.

Biederman, J., Milberger, S., & Faraone, S. V., (1995) Family-environmental risk factors for attention-deficit hyperactivity disorder. *Archives of General Psychiatry, 52,* 464–470.

Chermak, G. D., Hall, J. W., & Mussiek, F. E. (1999). Differential diagnosis and management of central auditory processing disorder and attention deficit hyperactivity disorder. *Journal of the American Academy of Audiology, 10,* 289–303.

Cohen, R. A. (1993). *The neuropsychology of attention.* New York: Plenum.

Conners, C. K., Epstein, J., & March, J. (2001). Multi-modal treatment of ADHD (MTA): An alternative outcome analysis. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 159–167.

Conners, C. K., March, J. S., Frances, A., Wells, K. C., & Ross, R. (2001). Treatment of attention deficit/hyperactivity disorder: Expert consensus guidelines. *Journal of Attention Disorders, 4,* 7–128.

Elia, J., Ambrosini, P. J., & Rapoport, J. L. (1999). Treatment of attention-deficit-hyperactivity disorder. *The New England Journal of Medicine, 340,* 780–788.

Elia, J., Gulotta, C., Rose, J. R., Marin, G., & Rapoport, J. L. (1994). Thyroid dysfunction in attention deficit hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 33,* 169–182.

Faraone, S. V., Biederman, J., Spencer, T., Wilens, T., Seidman, L. J., Mick, E., & Doyle, A. E. (2000). Attention-deficit/hyperactivity disorder in adults: An overview. *Biological Psychiatry, 48,* 9–20.

Faraone, S. V., Biederman, J., Wozniak, J., Mundy, E., Mennin, D., & O'Donnell, D. (1997). Is comorbidity with ADHD a marker for juvenile-onset mania? *Journal of the Academy of Child and Adolescent Psychiatry, 36,* 1046–1055.

Farmer, J. E., & Peterson, E. (1995). Injury risk factors in children with attention deficit hyperactivity disorder. *Health Psychology, 14,* 325–332.

Gaub, M., & Carlson, C. L. (1997). Gender differences in ADHD: A meta-analysis and critical review. *Journal of Child and Adolescent Psychiatry, 36,* 1036–1045.

Gillis, J. J., Ginger, J. W., Pennington, B. F., & De Fries, J. C. (1992). Attention-deficit disorders in reading disabled twins: Evidence for a genetic etiology. *Journal of Abnormal Child Psychology, 20,* 303–331.

Gingerich, K. J., Turnock, P., Litfin, J. K., & Rosen, L. A. (1998). Diversity and attention deficit hyperactivity disorder. *Journal of Clinical Psychology, 54,* 425–426.

Goldstein, S., & Goldstein, M. (1998). *Managing attention deficit hyperactivity disorders in children: A guide for practitioners* (2nd ed.). New York: Wiley.

Gomez, R., & Condon, M. (1999). Central auditory processing ability in children with ADHD with and without learning disabilities. *Journal of Learning Disabilities, 32,* 150–158.

Goodman, R., & Stevenson, J. (1989). A twin study of hyperactivity: II. The actiological role of genes, family relationships and perinatal activity. *Journal of Child Psychology and Psychiatry, 30,* 691–709.

Hauser, P., Zametkin, A. J., & Martinez, P. (1993). Attention deficit hyperactivity disorder in people with generalized resistance to thyroid hormone. *New England Journal of Medicine, 328,* 997–1001.

Hinshaw, S. P. (2000). Family processes and treatment outcome in the MTA: Negative/ineffective parenting practices in relation to multimodal treatment. *Journal of Abnormal Child Psychology, 28,* 555–568.

Hinshaw, S. P., Klein, R. G., & Abikoff, H. (1998). Childhood attention deficit hyperactivity disorder: Nonpharmacologic and combination treatments. In P. E. Nathan & J. Gorman (Eds.), *Treatments that work* (pp. 3–23). New York: Oxford University Press.

Hoza, B. (2001). Psychosocial treatment issues in the MTA: A reply to Greene and Ablon. *Journal of Clinical Child Psychology, 30,* 126–130.

Kuhn, T. S. (1962). *The structure of scientific revolutions.* Chicago: University of Chicago Press.

Latham, P. S., & Latham, P. H. (1992). *Attention deficit disorder and the law: A guide for advocates.* Washington, DC: JKL Communications.

McGee, R. A., Clark, S. E., & Symons, D. K. (2000). Does the Conners Continuous Performance Test aid in ADHD diagnosis? *Journal of Abnormal Child Psychology, 28,* 415–424.

Monastra, V. J., Lubar, J. F., & Linden, M. (2001). The development of a quantitative electroencephalographic scanning process for attention deficit-hyperactivity disorder: Reliability and validity studies. *Neuropsychology, 15,* 136–144.

Morgan, A. E., Hynd, G. W., Riccio, C. A., & Hall, J. (1996). Validity of *DSM–IV* ADHD predominately inattentive and combined types: Relationship to previous *DSM* diagnoses/subtype differences. *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 325–333.

MTA Cooperative Group. (1999a). A 14-month randomized clinical trial of treatment strategies for attention-deficit hyperactivity disorder. *Archives of General Psychiatry, 56,* 1073–1086.

MTA Cooperative Group. (1999b). Moderators and mediators of treatment response for children with attention-deficit hyperactivity disorder. *Archives of General Psychiatry, 56,* 1088–1096.

Nadeau, K., Littman, E. B., & Quinn, P. Q. (2000). *Understanding girls with attention deficit hyperactivity disorder.* New York: Bruner/Mazel.

National Institutes of Health. (1998). *Diagnosis and treatment of attention deficit hyperactivity disorder (ADHD) consensus statement.* Washington, DC: Author.

National Institutes of Health. (2000). National Institutes of Health consensus development conference statement: Diagnosis and treatment of attention-deficit/hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 182–193.

O'Laughlin, E. M., & Murphy, M. J. (2000). Use of computerized continuous performance tasks for assessment of ADHD: A guide for practitioners. *The Independent Practitioner, 20,* 282–287.

Pelham, W. E. (2000). Behavioral versus behavioral and pharmacological treatment in ADHD children attending a summer treatment program. *Journal of Abnormal Child Psychology, 28,* 507–525.

Pelham, W. E., Greiner, A. R., & MTA Cooperative Group. (2000, November). *Parent and teacher satisfaction with treatment and evaluation of effectiveness.* Poster presented at the annual meeting of the Association for the Advancement of Behavior Therapy, New Orleans, LA.

Pelham, W. E., & Hinshaw, S. P. (1992). Behavioral intervention for

ADHD. In S. M. Turner, K. S. Calhoun, & H. B. Adams (Eds.), *Handbook of clinical behavior therapy* (2nd ed., pp. 259–283). New York: Wiley.

Pelham, W. E., & Murphy, H. A. (1986). Attention deficit and conduct disorders. In M. Hersen (Ed.), *Pharmacological and behavioral treatments: An integrative approach* (pp. 108–148). New York: Wiley.

Perugini, E., Harvey, E., Lovejoy, D., Sandstrom, K., & Webb, A. (2000). The predictive power of combined neuropsychological measures for attention-deficit/hyperactivity disorder in children. *Child Neuropsychology, 6,* 101–114.

Resnick, R. J. (2000). *The hidden disorder: A clinician's guide to attention deficit hyperactivity disorder in adults.* Washington, DC: American Psychological Association.

Riccio, C. A., Hyad, G. W., Cohen, M. H., Hall, J., et al. (1994). Comorbidity of central auditory processing disorders and ADHD. *Journal of the Academy of Child and Adolescent Psychiatry, 33,* 849–857.

Roberts, R., & Mather, N. (1995). Legal protections for individuals with learning disabilities: The IDEA, Section 504 and the ADA. *Learning Disabilities Research & Practice, 10,* 160–168.

Root, R., Hammond, S., Owen, R., & Clattenburg, R. (1988). *Monitoring the placebo effect during stimulant medication treatment of ADHD children.* Unpublished manuscript.

Samuel, V. J., George, P., Thornell, A., Curtis, S., Taylor, A., Brome, D., et al. (1999). A pilot controlled family study of *DSM–III–R* and *DSM–IV*

ADHD in African-American children. *Journal of the American Academy of Child and Adolescent Psychiatry, 38,* 34–39.

Snider, V. E., Frankenburger, W., & Aspenson, M. R. (2000). The relationship between learning disabilities and attention deficit hyperactivity disorder: A national survey. *Developmental Disabilities Bulletin, 28,* 19–37.

Swanson, J. M., Kraemer, H. C., & Hinshaw, S. P. (2001). Clinical relevance of the primary findings of the MTA: Success rates based on severity of ADHD and ODD symptoms at the end of treatment. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 168–179.

Szatmari, P., Offord, D. R., & Boyle, M. H. (1989). Ontario Child Health Study: Prevalence of attention deficit hyperactivity disorder with hyperactivity. *Journal of Child Psychology and Psychiatry, 30,* 219–230.

Wells, K. C. (2000). Psychosocial treatment strategies in the MTA study: Rationale, methods, and critical issues in design and implementation. *Journal of Abnormal Child Psychology, 28,* 483–505.

Whalen, C. K. (2001). ADHD treatment in the 21st century: Pushing the envelope. *Journal of Clinical Child Psychology, 30,* 136–140.

E-Mail Notification of Your Latest Issue Online!

Would you like to know when the next issue of your favorite APA journal will be available online? This service is now available to you. Sign up at http://watson.apa.org/notify/ and you will be notified by e-mail when issues of interest to you become available!